

The Development of a Resource Manual for Licensed Practical Nurses:
Foot Care for High Risk Older Adults in a Long Term Care Agency
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Abstract

Preventative foot practices can assist high risk older adults (65 years and older) with their mobility and independence. Licensed practical nurses can play an important role in the implementation of interventions to provide foot health and preventative care to high risk older adults in a long term care agency. Therefore, in order to assist these health providers with the knowledge required to perform thorough foot and nail assessments and implement appropriate interventions within their scope of practice, a resource manual was developed to assist with meeting this goal. An extensive literature review was completed to obtain current evidence-based information during the development of the manual. Five modules were written using Knowles' Adult Learning Principles (1984) and Morrison, Ross and Kemp's Model of Instructional Design (2004). These modules included various relevant topics for example, high risk feet, aging feet, skin, nail and joint pathologies. One additional module provided other resources on the module topics. This report will be presenting the process in which the resource manual was developed for licensed practical nurses using advanced nursing competencies. It identifies the implications for nursing practice, limitations, and future recommendations.

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Foot health is an important component in the promotion and maintenance of overall physical health, mobility, and comfort for the older adult (65 years and older) (Bryant & Beinlich, 2003; Stolt, Suhonen, Voutilainen, & Leino-Kilpi, 2010; Stolt et al., 2012; Wright, 2009). Therefore, preventive foot and toenail interventions can assist the high risk older adult to maintain their independence. While healthy feet are vital to an individual's mobility, approximately 36% of older adults have at least one foot problem (Stolt, Suhonen, Voutilainen, & Leino-Kilpi, 2010). There are several reasons for the development of these foot problems. The performance of foot care in adults can become increasingly difficult with age due to changes in the individual's eyesight, skin integrity, decreased flexibility, and mobility. Aging skin also goes through much structural and physiological degeneration, some of which include less subcutaneous fat, reduction in blood flow, and lower numbers of collagen fibers (Ricci, 2011). External factors including medications, declining health, chronic diseases, smoking, and sun exposure are also big contributors to foot problems in the older adult (Ricci, 2011). It is estimated that approximately 60% of people aged 65 years and older have weakened nails due to fungal infections and do not wear properly fitting shoes (Ricci, 2011). Older adults diagnosed with chronic diseases for example, diabetes mellitus, peripheral vascular disease (PVD), and/or cognitive impairments are at high risk for foot problems and require quality nursing care (Canadian Association of Wound Care, 2013; Ricci, 2011; Stolt, Routasalo, Suhonen, & Leino-Kilpi, 2011).

An estimated 26% of older residents in long term care (LTC) have diabetes and/or foot ulceration and this can lead to potential limb loss without adequate foot

care (Wright, 2010). In comparison, from a global perspective, every 30 seconds an individual may lose a limb due to diabetes (Bentley, 2008). In Canada, diabetes foot ulcers cost the health care system more than \$150 million dollars annually (Canadian Association of Wound Care, 2013). This is a substantial number, especially considering the fact that more than 50% of foot ulcers can be prevented through basic, low cost interventions that require little advanced technology or expensive testing procedures (Lavery et al., 2013).

Regular, routine foot care in the older adult can have major benefits to residents in LTC such as, increased levels of mobility, early identification and prevention of foot issues, reduction in falls, and enhances a person's overall well-being. However, foot care remains an often-neglected area of nursing care (Lavery, Fontaine, & Kim, 2013; Wright, 2009). Evidence supports that the implementation of nursing interventions (i.e. thorough foot assessments, and daily foot care) by health care providers (HCP) which can prevent foot issues in the older adult that could lead to a wound, ulcer, amputation, or even death (Center for Disease Control, 2012; Ricci, 2011; Stolt et al., 2011; Watkins, 2012; Wright, 2010). Foot care includes inspection and cleansing of the feet, removal of calluses or other foot lesions, trimming the toe nails, application of hydrating cream, and education regarding proper sock and footwear selection and use (Canadian Diabetes Association Clinical Practice Guidelines, 2013; Davidson & Moreland, 2009; Registered Nurses Association of Ontario, 2007; Wright, 2009).

Foot problems in the older adult can greatly affect mobility and are a source of falls risk. Many foot problems in this age group are very preventable or at least

manageable if identified early. It's been found that HCP underestimate just how much a foot issue impacts quality of life for this group (Ricci, 2011).

Background

In 2007 I attained an Advanced Foot Care Nursing Certification from the Victorian Order of Nurses, St. John's, NL, after which I became very interested in foot health and foot care practices. I have conducted numerous foot clinics and personally worked with and spoke to individuals who suffer with foot ailments/issues. I was also the Nurse Coordinator for the creation of a diabetes foot care program where I now regularly conduct educational foot care clinics for diabetics from all areas of central NL.

The setting for the practicum took place at Carmelite House (CH), a 64 bed LTC agency located in Grand Falls–Windsor, in the province of Newfoundland and Labrador (NL). This agency only admits level three to four residents (see Appendix A for Levels of Care) while the mean age of these residents is 75 years.

The residents who live at CH experience various age related changes such as sensory impairments that interfere with their activities of daily living (ADL), chronic diseases, and/or cognitive impairments (diagnosed as mild, moderate and severe). As a result, they require supervision for ADLs and are dependent on HCP for completion of their foot care.

Rationale

During informal discussions with some of the Licensed Practical Nurses (LPNs) and Personal Care Attendants (PCAs) staff at CH in the spring 2013, they expressed anxiety and lack of knowledge in relation to providing foot care for the

high risk older adult. The staff also reported feelings of fear, stress, and reluctance to perform the foot care required by these residents. Nursing Management and Clinical Educators also identified that the residents' family members voiced concerns in relation to the daily foot practices for their loved ones. At CH, LPNs and Registered Nurses (RNs) are the only health care providers who perform residents' foot care with LPNs having the majority of assigned care. While the PCAs wash and dry the residents' feet, they are not allowed to cut toe nails, remove callus (es), or perform wound care. While CH does have resource manuals available to their LPN staff, none of them pertain to foot health and the foot care needs of the older adult. Currently, the only resource manuals available at CH regarding foot care are those focused to the scope of practice of the RN. This creates a barrier to quality foot practices where there are no foot care resources available for LPNs.

Therefore, based on this information, I decided that the resource manual would be most beneficial to the LPNs within their scope of practice.

The resource manual developed for LPNs defines high risk older adults, changes in the aging feet and toenails, describes common skin, nail, and joint pathologies seen in the older adult, outlines preventative care measures, nursing interventions, and best practice for the high risk foot, and also provides additional resources for further learning. The resource manual has been designed to enable LPNs to accept accountability for self-directed use in preparation to perform foot care to high risk older adults. Knowles' Adult Learning Principles (1984) and Morrison, Ross, and Kemp's Model of Instructional Design (2004) were utilized to guide in the development of this educational resource.

Purpose

During my nursing education practicum, I developed a resource manual for LPNs working in LTC. The resource manual contains current evidenced- based information related to providing foot care for high risk older adults. Its purpose is to provide a quick, accessible, well researched, portable, up to date, and user friendly guide to help staff working in LTC to meet their residents' foot health and foot care needs.

Contact Person

My contact person for the nursing education practicum was Mrs. Dana LeDrew, Nurse Manager for CH and Medicine within Central Health Authority (CHA). She expressed her assistance for the development of the resource manual in a letter of support. (see Appendix B). Following Mrs. LeDrew's departure from this position in February 2014, Ms. Krista Toms became my contact person in her new role as Nurse Manager of CH. Ms. Toms also provided a written letter of support in relation to the practicum (see Appendix B).

Ethical Approval

The Health Research Ethics Authority (HREA) of NL is a non-profit agency that was established by the Health Research Ethics Authority Act (Health Research Ethics Authority, 2011). Its mandate is the general supervision of all health research involving human subjects conducted within the province of NL. It ensures that health research involving human subjects is conducted in an ethical manner. It is also responsible for enhancing public awareness of the ethical dimension of health research involving human subjects (Health Research Ethics Authority).

During the development of this resource manual there was no involvement of human participants. However, during the practicum course there was a Canadian environmental scan of health care agencies and associations for the purposes of information gathering. Informal discussions were also help with HCPs and nursing staff i.e. PCAs, LPNs, RNs, a Clinical Educator, and the Nurse Manager at CH. The HREA screening tool was completed for determining the appropriate route for the ethics review. Ethical approval was not required for these activities.

Objectives

The completion of the resource manual has resulted in the achievement of the following objectives:

1. To conduct a literature review related to the different foot care practices for high risk older adults performed by HCPs in LTC agencies.
2. To utilize Morrison, Ross, and Kemp's Model of Instructional Design (2004) and Knowles' Adult Learning Principles (1984) in the development of a resource manual.
3. To develop the content for the resource manual using research based evidence from the literature.
4. To demonstrate advanced nursing competencies for example, collaboration, consultation, leadership, and research utilization during the development of the resource manual on foot care for the high risk older adult in a LTC agency.

This report will discuss the process, theoretical framework, and advanced nursing competencies, which contributed to the completion of the resource manual.

The first step was a comprehensive literature review in accomplishing these outputs.

Literature Review

An extensive literature review has been conducted to examine the role of the RN and the LPN employed in LTC providing foot care to older adults. Several databases were utilized in the search including CINAHL Plus and PubMed via Memorial University of Newfoundland's (MUN) online library. Key words and topics searched were *foot care, nursing education, older adult, high risk, foot care practices in the elderly, education, resource manuals and aging*. The results of the search identified several themes such as: prevalence and impact of foot care on the older adult population, implications for nursing practice, and the role of resource manuals for HCP.

Prevalence and Impact of Foot Care on the Older Adult Population

Foot health is a vital component in the promotion and maintenance of overall physical health, mobility, and comfort for the older adult (Bryant & Beinlich, 2003; Stolt, Suhonen, Vouti-lainen, & Leino-Kilpi, 2010; Stolt et al., 2012; Wright, 2009). There is evidence to support both the importance of foot care in older adults who are at increased risk for foot complications (Ricci, 2011; Stolt et al., 2011; Stolt et al., 2010; Watkins, 2012; Wright, 2010) and those who are healthy (Ricci, 2011; Stolt et al., 2010). The evidence for foot care promotion in the healthy population is important as there are high levels of healthy older adults (23-98% reporting one foot health problem and 14-53% reporting three foot health problems) who suffer with foot problems (Stolt et al., 2010). The rate of foot problems in the elderly

population is estimated to be double that of the general population with 40-86% of older adults reporting foot problems (Pataky et al., 2007; Watkins, 2012). Foot care problems increase significantly with increased age (Stolt et al., 2012). Examples of conditions that put the older adult at risk include diabetes mellitus, peripheral vascular disease (PVD), cognitive impairments, decreased mobility, sensory impairment, rheumatoid arthritis, and peripheral arterial disease (Registered Nurses Association of Ontario, 2004; Ricci, 2011; Stolt et al., 2010; Williams & Graham, 2011). Foot problems such as, a corn or ingrown nail, can cause an older adult to lose their balance, experience decreased mobility, and is a significant, independent predictor of falls in this population (Ricci, 2011; Stolt et al., 2012; Wright, 2009). Although these foot facts are known, foot health and foot care interventions are an often neglected and underestimated component of nursing care (Lavery, Fontaine, & Kim, 2013; Pataky et al., 2007; Stolt et al., 2012; Wright, 2009).

Foot care can become difficult with age due to changes in an individual's eye sight, decreased flexibility and mobility, chronic disease (e.g. diabetes mellitus, peripheral vascular disease, rheumatoid arthritis), cognitive impairment (e.g. dementia), and changes in the aging skin integument which may cause problems with wound healing (Lavery et al., 2013; Pataky et al., 2011; Registered Nurses Association of Ontario, 2004; Ricci, 2011; Sibbald, Campbell, Coutts, & Queen, 2003; Stolt et al., 2010; Stolt et al., 2011; Stolt et al., 2012; Williams & Graham, 2011; Wright, 2009). The older adult often requires assistance with self-care and care of their feet (Stolt et al.). Foot ailments in the elderly can also significantly impact the quality of life for these individuals (Ricci; Stolt et al.; Stolt et al.; Wright).

When preventative foot care practices are utilized they not only assist the older adult, but these interventions also help reduce financial burden on the Canadian health care system. In Canada, the average cost of treating an acute foot wound is \$11,840 compared to the average cost of treating a chronic foot wound which is \$10,376. Both acute and chronic wounds can take an average of 165 days to heal. In total, diabetes foot ulcers cost the Canadian health care system more than \$150 million dollars annually (Canadian Association of Wound Care, 2013). This is a substantial economic cost considering the fact that more than 50% of foot ulcers can be prevented through basic, low cost interventions that require little advanced technology or expensive testing procedures (Berry & Raleigh, 2004; Lavery et al., 2013).

Implications for Health Care Providers

Registered nurses and LPNs play an instrumental role in identifying and reporting foot health and foot care issues in the older adult in LTC (Stolt et al., 2010; Stolt et al., 2012). Simple, low cost, time efficient interventions and assessments can greatly decrease foot problems (Bentley, 2008; Berry & Raleigh, 2004; Fujiwara et al., 2011; Stolt et al., 2010). Shiu and Wong (2011) conducted a survey of 65 RNs with a mean age of 33 years (who had taken a post registration certificate course in diabetes nursing) in a Hong Kong hospital to assess their knowledge on diabetic foot care. Of the sample, 92% (n= 60) had attained a Bachelor degree or above, 34% (n= 22) had been working in diabetes care specialty services, and the mean length of post registration experience was nine years. For the purposes of their survey they used the Diabetes Foot Care Knowledge Scale (DFKS), which was previously

developed and validated in Hong Kong in 2007. The mean DFKS score was 41.4 out of a total 65 marks. The results showed that RNs with diabetes work experience had a DFKS score of 41.5 and those without diabetes work experience had a DFKS score of 41.3. These two groups had very similar DFKS scores ($p = 0.924$). Interestingly, the RNs who had prior training in diabetes foot care had a DFKS score of 43.1, scoring higher than those without training (DFKS of 40.1) yielding a $p = 0.055$. These findings suggest that training may have a stronger impact on knowledge development than work experience alone. Limitations to this study are the small sample size and the fact that all of the participants came from one hospital in Hong Kong. However, the authors suggest that the findings provide a good base for future exploration in nursing education and that it can be applicable to hospitals and areas outside of Hong Kong. Therefore, in order to prevent foot issues in individuals that are high risk, a nurse first needs knowledge to be able to carry out those limb and life savings foot practices. This study provides some evidence to support education for nurses as a way to help meet the goal of nurse competence in diabetes foot care.

Stolt, Suhonen, Voutilainen, and Leino-Kilpi (2010) completed a literature review on foot health in older people and the nurses' role in foot care and foot health. The literature review was focused on older adults with no health complications. Data were collected from 1980-2008 to ensure a comprehensive perspective on the research topic. A total of 35 studies were reviewed after applying inclusion criteria. Stolt et al. conducted a literature review that is thorough, identifies important gaps in the literature, well organized with clear development of ideas, and summarizes evidence to draw reasonable conclusions. Results of the

review concluded the following: (a) a large number of studies on foot care problems were found in the literature, but that nurses' knowledge of foot care was only present in a few studies, (b) there are a multitude of foot problems in the older population, foot problems effect the mobility and daily functioning of the older adult, older adults self care ability decreases with age, and (c) nursing staff play a key role in identifying and implementing foot care. These authors also found that educational programs appeared to benefit nurses' knowledge of foot care. Although nurses may think of their practical foot care activities (e.g. nail cutting) to be inadequate, nursing staff at LTC agencies need to pay attention to the older adults foot health. This is necessary, in order to prevent and treat any problems that may arise that can have detrimental effects on these individuals.

The findings described by Stolt et al. (2010) support that healthy older adult's have a multitude of foot problems. Nursing staff plays an important part in identifying and preventing foot problems in the older adult, in particular in the LTC setting. These researchers also found that educational materials benefit nursing staff's knowledge of foot care.

There were several limitations of this review. First of all, the focus was only on healthy older adults. This limits the generalizability of the results. There were limited data bases searched to gather research on the topic and the majority of the studies were based out of North America (more settings would increase our universal understanding on foot care health and practices). While most of the studies were descriptive which limits the evidence, additional studies carried out in other designs and methods would provide stronger evidence to add to their review.

There is evidence to support that decreases in the number of lower limb amputations, ulcers, chronic wounds, and even death occur when a health care worker is educated and provides routine foot care and assessments. (Berry & Raleigh, 2004; Fujiwara et al., 2011; Martinez & Tripp-Reimer, 2005; Meaney, 2012; Moulton, 2012; Pataky et al., 2011; Ricci, 2011; Sheridan, 2012; Shiu & Wong, 2011; Stolt et al., 2012; Wright, 2010). Fujiwara et al. (2011) designed a preventative foot care nursing program based on the International Working Group on the Diabetic Foot (IWGDF). The purpose was to investigate its effectiveness in preventing diabetic foot ulcers for individuals. Eighty-eight patients (57 men and 31 women) attended the foot care program over a two year period (April 2005- March 2007). The participants were divided into four groups based on their risk classification according to the IWGDF (risk of 0-3) and received foot care. Patients were then seen by a professional nurse who provided education and foot care to them according to their risk classification (e.g. risk score determined how often the participant was seen). After the two year program, it was found that instances of tinea pedis and tinea unguium (Wilcoxon's signed rank sum test; $Z = -3.740$, $P = 0.001$), callus (Wilcoxon's signed rank sum test; $Z = -3.256$, $P = 0.001$), and foot ulceration all decreased, improved or were prevented all together. The results show that application of a diabetic foot care program by a nurse specialist who provides foot care can assist in preventing diabetic foot ulcers, callus formation, tinea pedis, and tinea unguium in these high risk groups. Limitations of this study included the absence of a control group; individuals left untreated and compared to the study group were not used for ethical reasons (e.g. diabetics and other high risk groups

need/require foot care to prevent issues with the foot and their health). The sample size for this study was also small and limited to those with high risk conditions e.g. the majority of the clients were diagnosed with diabetes. Therefore, the information cannot be generalized to the greater population. The authors suggest further studies are required to confirm their findings.

Stolt et al. (2012) completed a descriptive explorative study on foot health and self-care activities of older people (65 years of age or older) in home care. Two data collection tools were developed for this study. These tools were the Foot Health Assessment Instrument (FHAI) and the Foot Self-Care Activities Structured Interview (FSCAI) to evaluate the older adults' self-care activities. The data collection was conducted from May-October, 2010 in nine home agencies by 651 home care nurses who all had a professional qualification (registered nurse, public health nurse, or licensed practical nurse). Of the 309 older adults who participated in the study, the majority was female ($n = 263$) and the mean age was 83.4 years.

The data were analyzed using SAS version 9.1. Descriptive statistics were conducted to examine the variables. Associations between background factors, single foot health, and foot self-care items were analyzed using the Chi-square test, Fisher's Exact test, Wilcoxon or Kruskal-Wallis test as appropriate. Pearson's correlation was used to analyze associations between the Foot Health Index and Foot Self-Care Index. P-values < 0.05 were evaluated as statistically significant in the study. While Cronbach's alpha coefficient was used to measure the internal consistency of the sum variables, Index was analyzed with the t-test. The newly developed FHAI and FSCAI's internal consistency reliability was found to be 0.64 for

the FHAI and 0.74 for the FSCAI using Cronbach's alpha. These alpha values are promising considering criterion value 0.70 set for newly developed scales.

Although older adults rated their foot health as good (n = 115), fair (n = 104) and poor (n = 46), the Foot Health Index revealed these individuals had multiple foot problems. Examples included the older adult's lack of foot self-care from washing feet, changing socks to applying cream. Of 111 participants, the majority (n = 106) reported being unable to cut their own toenails due to thick toenails or an inability to bend down to cut their toenails. According to the Foot Health Index the average number of foot problems was 9.1 per older adult. The most common foot problems reported for the older adult were dry skin, thickened and discolored toenails, and hallux valgus. Results of this study suggest that older adults may not have adequate knowledge of proper foot care and therefore, nursing staff need to evaluate and support the older person's ability to perform self-care of the feet. Health care professionals play a key role in identification of foot problems and in helping the older adult to meet their foot health needs.

There are several limitations of this study. One limitation is the low participant response rate of forty-seven percent (N=309). The authors concluded that this was possibly due to lack of patient recruitment by the home visiting nurses or the older adults interest in the study. Another limitation is the lack testing of the FHAI. Further testing needs to be done utilizing the FHAI to reveal its sensitivity, clinical utility, and reliability as an instrument.

Nurses (LPNs and RNs) who work in LTC have opportunities to implement daily foot care for older adults using evidence in the literature (Berry & Raleigh,

2004; Beeckman, Duaso, Rajpaul, & Tremlett, 2011; Burland, 2012; Fujiwara et al., 2011; Meaney, 2012; Moulton, 2012; Pataky et al., 2011; Registered Nurses' Association of Ontario Best Practice Guidelines, 2004; Shiu & Wong, 2011; Stolt et al., 2012; Wright, 2009; Wright, 2010). Daily foot care includes a thorough foot assessment, inspection for reddened areas and/or impairment of skin integrity, callus formation, ingrown nails, ulcers, wounds, foot and foot wear assessments, proper foot and nail care, and general daily assessment/care (Bentley, 2008; Canadian Diabetes Association, 2013; Inlow, 2003; Veterans Affairs Canada, 2012; Wright, 2010). Therefore, the nurse is accountable to identify high risk individuals, have knowledge of routine foot and nail preventative practices, and be knowledgeable of foot and nail pathologies. Nurses should also demonstrate the ability to know when an identified issue needs to be reported to the correct health care provider (Bentley, 2008; Lyman & Vlahovic, 2010; Morris, 2012; Pataky et al., 2007; Stolt et al., 2012) because often a small wound can become larger more quickly in high risk older adults (CDA, 2013; Fujiwara et al., 2011; Sheridan, 2012).

Health care providers play a key role in the prevention of foot complications in the older adult population. Thus, it becomes important to gather information on ways to aid HCPs in attaining the foot care knowledge they need. A one-year longitudinal prospective study by Pataky et al. (2007) evaluated an educational program developed for HCPs. The educational program focused on preventing foot complications in older adults at a LTC facility in Geneva, Switzerland. The sample consisted of HCPs of Loex Hospital (Department of Rehabilitation and Geriatrics at the University Hospital of Geneva). During the study, 236 pre-program

questionnaires were completed and 172 questionnaires twelve months post program (response rate of 75.9% and 55.1%). Some of the HCPs included in the sample were nurses (pre program 128, post program 84), doctors (pre program 17, post program 13), and nursing aids (pre program 67, post program 54). During the study the researchers: (a) held educational sessions with the HCPs and patients, (b) developed and utilized a questionnaire to evaluate initial knowledge of the HCPs in at-risk foot health, and (c) evaluated the impact of the program on the HCPs knowledge one year after the start of the program. Statistical analysis was carried out using Stata Version 9.1, Pearson's chi-square test for qualitative data, and the Mann-Whitney test for quantitative data. A P value of less than or equal to 0.05 was considered as the threshold of statistical significance.

Results showed that knowledge had significantly improved after the educational program in all HCP groups, except the doctors, with nurses and nursing aids showing the most significant rise in knowledge scores. The global knowledge score after the twelve month period was evaluated by the Mann-Whitney test and presented as a median score. There were significant increases in knowledge in the RNs (8 versus 9, $P > 0.001$), nurse's aides (7 versus 8, $P = 0.001$), and other HCPs (7 versus 9, $P = 0.01$), but no significant rise in the doctors (9 versus 10, $P = 0.56$). The authors stressed that the nurses and nursing aids have a momentous role to play in preventing foot complications, increasing LTC residents' QOL, and in the residents' daily follow up and care. They believe that the nurses and nursing aids' have the most opportunities to provide preventative foot care practices in the LTC setting because of their frequent close contact with residents. They also suggest that

education on a specific consultation to be an effective way of improving theoretical knowledge and to aid in changing HCPs behaviors.

Limitations of this study include the fact that the study was conducted in only one urban hospital. Further studies should be carried out in other countries and in other settings (e.g. community) so that the findings can be more broadly applied. This study has evidence to support education as a way to decrease foot complications in the at-risk populations of LTC facilities in hospital and at home.

The Role of Resource Manuals

The role of resource manuals is supported in the literature as being an effective learning tool (Sparling, 2001). They are a cost effective, convenient and simple method to educate and assist individuals to remain current in their knowledge on a topic (Sparling). Resource manuals can meet the learning needs of its intended audience and provide them with evidenced-based practice information (Mitchell & Courtney, 2005; Kaufman, 2000). While the LPN will already have some background knowledge and practical experiences to meet the older adults foot care needs, a resource manual that identifies current best practice foot care information will help to lessen their stress and anxieties around caring for high risk older individuals (Brady, 2013). Licensed practical nurses are very busy during their workday. They may not observe many of the foot pathologies that they were taught in the practical nursing (PN) program on a regular basis. A resource manual will be a valuable tool for these HCPs to assist them in reviewing specific foot techniques and management skills for the foot pathology they are assessing at that moment. This will save time and also help them remember and re-learn procedures and

techniques on a regular basis that they may have forgotten, didn't have many previous experiences with, or have become less confident in performing (Brady, 2013). Health care providers are expected to be current with the latest guidelines and evidence. Therefore, this means that they are to seek information on a regular basis. An educational resource manual can be an effective way to meet the need to stay up to date with the latest information in foot care practices for the older adult in a timely and autonomous manner.

In summary, routine foot care is greatly beneficial to both healthy and high risk older adults. Without daily routine foot care the older adult can experience discomfort, decreased QOL and well-being, loss of balance, increased falls risk, amputation, and in some cases, even death. The preventative measures suggested in the literature require little technology or cost, but have huge benefits for the client and substantial monetary savings for the health care system (Lavery et al., 2013). Overcoming barriers such as, time constraints, lack of knowledge, and confidence to implementing the suggested foot care practices is a very important step to meeting the HCPs' and older adults' educational and health needs. One way to overcome this barrier is to put in place an educational resource manual that is quickly accessible and allows the HCP to gather the specific information they need in a timely manner (Brady, 2013).

Theoretical Framework

Following the review of several theoretical frameworks, it was determined that Knowles' Theory of Andragogy (1984) and Morrison, Ross, and Kemp's Model

of Instructional Design (2004) would best support the development of the resource manual.

Principles of Adult Learning

Knowles' Theory of Andragogy (1984) includes the concepts of critical thinking, personal accountability and self-directed learning. It also describes creating student centered learning. This requires the developer to determine the learning needs of the user(s) and then apply these findings. Knowles' Adult Learning Principles (1984) was utilized in the development of the resource manual and it incorporates six principles that are associated with adult learning.

The first principle, the need for information, discusses how adults develop a need to know how the learning of new information is important to them and how this knowledge will benefit them in the future (Knowles, 1984). The resource manual has been designed and focused on high risk foot care for the older adult and was created to help meet the learning needs voiced by LPN staff at CH. The LPNs who will be using the resource manual had expressed a low self-confidence in performing adult foot care in the high risk older adult population. In discussion with the LPNs at CH they reported seeing a personal benefit in their daily practices by having this resource manual available to them in their place of work. They stated that the manual will assist with increasing their confidence in performing foot care and health related education and practices for the residents. Based on this information, this meets Knowles' first principle.

The second principle discusses self-concept. As children we start out with a self-concept of dependency, relying heavily upon adults to teach us and steer us in

the right direction with little input or control by ourselves. As we become adults we develop a self-concept of independence and thrive on self-directed behaviors and ways of learning in our lives (Knowles, 1984). Since a resource manual is an educational document that the LPN can access and use on their own time and at their own pace, it is in essence a self-directed learning tool. Module six of the foot care resource manual has a list of additional resources on foot care that the user can review should they wish to learn more and read further. Also, throughout the manual in all of the modules there are links to online resources should they also independently wish to access them (see Appendix C). The independent nature and self-directing design of a resource manual fits Knowles' second principle of self-concept in the adult learner.

The third principle incorporates the role and importance of past experiences. Over time, adults grow and develop an increasing knowledge base that becomes a rich resource for learning. Adults attach more meaning to the personal experiences they have over more passively acquired knowledge. The past experiences of the learners, in this case LPNs, can help or hinder their new learning experiences (Knowles, 1984). The resource manual was developed based upon the basic foot care information taught in the PN program. During the discussions with the LPN staff, many expressed that they did not feel confident in their foot care practices of the high risk older adult, while others revealed that they were still carrying out practices that are not supported by the literature (e.g. putting lotion between the individual's toes). Concerns of the LPN staff and the fact that some of their current practices were not evidenced based were considered in the development of the

resource manual to help improve clinical practices and outcomes, as well as meet LPNs current and future goals. The LPNs reported past experience of feeling unsure, unconfident, and having fears while performing foot care to high risk older adults can leave the HCPs feeling unsatisfied at work. This resource manual will assist the LPNs in their daily practice. Therefore, it is taking a negative past experience and transforming it into a positive one where they may experience satisfaction, competence and confidence in their foot care practices. The consideration of the LPNs past experiences and education provided me with the insight to adapt the resource manual to better meet their learning needs and Knowles' principle of past experiences.

The adult's readiness to learn is the fourth principle. Adults become ready to learn when they see a need to learn, especially when the need to learn will help them cope in their daily tasks/problems e.g. improving their foot care practices (Knowles, 1984). The LPNs at CH have already expressed some of their learning needs to clinical educators, nurse management, and I. This demonstrates their ability to have insight into their own learning needs. During development of the resource manual Morrison, Ross, and Kemp's Model of Instructional Design (2004) was utilized to help create conditions and tools for helping the LPNs discover their 'need to know' (e.g. sequenced according to learners ease of use and presented in a way that they can directly relate it to their practices with the older adult/resident's in their care). The LPNs ability to know what they need to learn and express enthusiasm about self-improvements exhibits Knowles' principle of readiness to learn.

The fifth principle involves the adult's orientation to learning. Adult learners view education as a process of increasing their independence to achieve their full potential. They want to apply the skills they have learned to their life today. Adults over time have shifted from a more subject focused learning to a performance-focused learning. For adults, education is viewed as a process they go through to improve their current life situation (Knowles, 1984). The LPNs at CH have expressed their feelings of stress and lack of confidence in performing foot care practices with high risk older adults. It is hoped that the resource manual will be a learning tool that will assist them in meeting this goal. By utilizing the manual the LPNs will be able to apply its content immediately to their work and daily practices and see fast results (e.g. increase in confidence). Knowles' principle of orientation to learning is satisfied in the LPN target group because they have a desire to attain information on foot care best practices and know they can use these skills and techniques right away to assist them in their daily foot care practices.

The final principle involves motivation. Motivation needs to be present for learning to be successful. All of Knowles principles, if met, create motivation within the adult learner. When motivation is absent such as, when the learner cannot see a need for the information, past experiences have made them feel education/learning is a negative experience, or they are not ready to learn, then learning cannot take place (Knowles, 1984). The LPNs voiced a desire to learn current evidence-based foot care practices in order to provide competent and confident care to high risk older adults. This shows their motivation to learn and their willingness to use the resource manual. Therefore this meets Knowles' principle of motivation.

Barriers to learning need to also be acknowledged for the adult learner. Some barriers common to adults are time constraints and lack of confidence, both of which were expressed by LPN staff at CH. While the resource manual is a learning tool that can be used at the LPNs convenience, it is designed to be quick, to the point, easy to navigate and use, and available online at every computer located in Central Health Authority (CHA), and thereby helping to meet the needs of the HCPs who have time constraints. Also, for those LPNs with decreased confidence, it is a learning tool that is independent (e.g. no one watching or critically analyzing the LPN), with low stress that will assist the LPN to attain the evidenced-based information they need to support their practice. As the LPNs regularly utilize the resource manual in their daily practices, it is expected that they will have increased confidence and knowledge in performing foot care to the high risk older adult.

Learning styles differ between individuals. Some adults learn better when they can see the bigger picture while others benefit more from getting all of the details and want to see everything step-by-step. Some of the learning styles that I considered when developing the resource manual were: visual (learns by images, pictures, and demonstrations), auditory (learns using sound), logical (learns using logic and reasoning), and solitary (learns best working alone and through self-study (Brady, 2013). In order to meet the LPNs different learning styles, I incorporated images, pictures, demonstrative videos, evidenced-based materials, references and a whole module dedicated to additional resources for further reading within the resource manual.

Through the use of Knowles' Adult Learning Principles (1984) I was able to develop a manual that is tailored to the LPNs which addresses their varying learning styles. As a result, the LPNs will have an educational resource that best supports their individual daily foot care practice needs.

Model of Instructional Design

An instructional design is a method for creating educational materials and interventions that are structured to enhance skills and performance with a focus on the learner. During the development of the resource manual Morrison, Ross, and Kemp's Model of Instructional Design (2004) was utilized as the theoretical framework.

Morrison, Ross, and Kemp's Design (2004) contains nine elements that are represented in a circular model. This framework is adaptable to the situation, learner, and developer. The nine elements are not meant to be used in a linear fashion but instead work together in an integrated manner, making it very flexible and user friendly. Evaluation and revision are ongoing throughout its use so changes and adaptations can be done as required. The nine elements of the framework and how they were utilized during the practicum are as follows:

Instructional Problems

The identification of problems and goals during the development of this resource manual was completed through information gathering at CH with nursing staff, nurse managers, and nurse educators in spring of 2013 and again in fall of 2014. My goal for the practicum was to develop a foot care resource manual for the

LPNs of CH to assist them in their clinical practice. I have accomplished this goal through the completion of my four objectives.

Learner Characteristics

Examination of the learner's characteristics was conducted so that the resource manual would best suit the LPNs individual needs and barriers/problems. Characteristics such as education level, language, age, work environment, and experience were all examined and taken into consideration when developing the resource manual. Knowles' Adult Learning Principles (1984) were also utilized in the assessment of learner's characteristics. By doing so, it ensured the manual would meet the LPNs needs and assist them in their clinical practice.

Task Analysis

This element looks at the skills and knowledge required to meet the identified needs. The LPNs, whom the resource manual has been developed for, have education in the area of foot health and foot care from the PN program. All of the content within the foot care resource manual is current and evidenced-based so it will assist the LPNs in meeting the LTC residents' foot care needs while doing so at their current skill and knowledge level.

Instructional Objectives

The resource manual was designed to guide the LPN in their clinical practice and provides them with a well-organized and straightforward clinical resource. Instructional objectives are listed clearly at the beginning of every module in the resource manual. The objectives state exactly what will be discussed during the module in a quick and clear manner.

Content Sequencing

The resource manual is designed to be logical and sequential in its content. It was important to me to make the manual easy to follow so that the desired information is quick and simple to locate, making it a time saver for busy LPNs. The manual layout has been discussed with the LPNs, their nurse manager, and clinical educator who will be using it. These consultations help to ensure it is meeting their particular learning needs and clinical practice goals.

Instructional Strategies

This resource manual will be utilized as a reference guide for LPNs in their daily practice. One of the main desired outcomes from creating this resource is that it will support the LPNs in making clinical judgments with more confidence and assurance regarding older adult's/resident's foot care.

Designing the Message & Instructional Delivery

In the next two steps designing the message and development of instructional materials are discussed. These included choosing images, graphics, website links for online use, tables, titles, and font size. The resource manual is grouped into six modules that are logical in sequence. Headings and objectives are placed at the beginning of all modules for ease of use in locating desired information. Each module has been designed to provide important information to the LPN. This ensures that a LPN who only needs to review one module today will not miss these important points such as the "When to Report" and "Documentation" sections which are included at the end of every module. Also, graphics in each module are of the same design (e.g. module one has all circular graphics with

matching colors while module three has rectangular graphics of matching colors) so that the user can visually see the 'theme' of each module and become familiar with the manual over time. Data within the resource manual has all been based upon current best practices as evidenced in the in-depth literature search that was completed, as well as, from consultation and collaboration with PN instructors, clinical educators, LPN staff, nurse managers, foot care/health experts, and many others. All of the elements within the resource manual assist the user in gaining knowledge about a particular topic or refresh their memory and/or build upon topics already known in a concise manner. Currently there are no other foot care resource manuals for LPNs in LTC in Central Health Authority.

Evaluation Instruments

The final step of in the instructional design involves evaluation instruments. In the opening pages of the resource manual there is a 'Myths and Misunderstandings' section that helps the user to evaluate current foot care knowledge and assists them in assessing any strengths and/or areas for improvement they may have before proceeding to read the manual. It assists the user in identifying the myths versus the facts. After the resource manual has been put into place and utilized by staff, an informal interview and discussion with staff can determine if they are feeling more confident in their knowledge of foot care practices in the high risk older adult. The Nurse Manager and Clinical Educator can also check in with LPN staff to assess if they are utilizing the best practice recommendations with their residents in their daily care. This can be accomplished through informal interviews and/or by assessing their performance in person. The

clinical educator at CH takes the lead in learning resource evaluation and staff education and plays a key role in continuing to encourage and discuss this resource with staff after it has been implemented in the work place. The clinical educator at CH will also be assessing to see whether the resource manual has impacted resident foot care outcomes positively over time.

Activities

My goal for the practicum was to develop a resource manual for LPNs, in order to assist them in providing foot care to high risk older adults at CH LTC agency. My goal was accomplished through the completion of four practicum objectives. The activities involved in the achievement of these objectives are described below.

Objective One: To conduct a literature review related to the different foot care practices for high risk older adults performed by health care providers in LTC agencies. An extensive literature review was conducted to determine the current evidenced-based practices for foot health and foot care being provided to high risk older adults by HCPs in LTC. Two specific search engines i.e. CINAHL and PubMed via Memorial University of Newfoundland (MUN) online library were utilized in the search. Key words were foot care, high risk older adult foot care practices, aging, nursing education, continuing education, professional development, practice, resource manuals, and adult learning. These topics were thoroughly researched to attain the information needed for developing the resource manual and to ensure its accuracy. The literature review contained research that supports resource manuals

as effective learning tools in the health care setting, as well as the importance of utilizing preventative foot care practices in the older adult population.

Objective Two: To utilize Morrison, Ross, and Kemp's (2004) Model of Instructional Design and Knowles' Adult Learning Principles (1984) in the development of a resource manual. The resource manual was developed utilizing Morrison, Ross, and Kemp's Model of Instructional Design (2004) and Knowles' Adult Learning Principles (1984). See the section of this report titled "*Theoretical Frameworks*" for more detailed information on how this objective was achieved.

Objective Three: To develop the content for the resource manual using research based evidence from the literature. Evidence-based information was utilized during the development of the resource manual. This evidence was drawn from the extensive literature review that was completed throughout the practicum project. A Canadian environmental scan of several hospitals and LTC agencies was conducted to gather information in relation to foot care practices and foot care programs. One nursing educator was consulted and she provided information on the Practical Nurse curriculum pertaining to foot care and the older adult. In addition, key stakeholders such as, the LPNs, clinical educator, and nurse managers of CH were contacted to discuss the current practice issues associated with the delivery of foot care to high risk older adults.

Objective Four: To demonstrate advanced nursing competencies for example, collaboration, consultation, leadership, and research utilization during the development of the resource manual on foot care for the high risk adult in a LTC agency. Advanced practice nursing (APN) involves seven core competencies which

include expert coaching and guidance, consultation, research, leadership, collaboration, and ethical decision-making (Hamric, Spross, & Hanson, 2014). I feel that throughout my practicum I have grown professionally and demonstrated the advanced nursing competencies of collaboration, consultation, leadership, and research utilization. I will provide a description of each of these advanced nursing competencies and illustrate with examples of how I achieved each competency.

Collaboration

Collaboration is an interaction between individuals that enhances and creates learning experiences, helps to solve problems, values diversity, aids to achieve goals, and recognize skills (Canadian Nurses Association, 2002a; Hamric, Spross, & Hanson, 2014). I have demonstrated this competency throughout the practicum by collaborating with the LPNs, clinical educator, and nurse managers at CH in development of the resource manual. Together with these individuals I was able to develop a resource manual for CH staff that would be accurate and meet their individual needs. These discussions occurred on different occasions throughout the practicum project. This collaboration insured that the manual would be best suited to the needs of the LTC staff. For this to occur there was ongoing communication between the LPNs. After each collaboration with these HCPs, I learned new information that assisted in the development of the manual.

Consultation

Consultation is an important part of advanced practice nursing (APN). It is demonstrated by utilizing the knowledge of other specialties to compliment and enrich a teaching intervention (Cooke et al., 2008). It can enhance client care and

promote positive professional relationships (Hamric, Spross & Hanson, 2014). Consultation assisted me in developing a resource that will assist in improving resident care delivery processes, resident foot care outcomes, provide a resource that will assist the LPNs in solving clinical problems, and foster the LPNs professional development (Hamric et al.). I have demonstrated this competency throughout my practicum in discussions with nurse educators and nurse foot care experts in clinical practice. I've also had discussions with the Nurse Managers of CH, who were very enthusiastic about the foot care resource manual and felt it was a valuable educational resource for the LPN staff. Through ongoing discussions with the LPNs at CH I've also received information in relation to their learning needs and preferences, as well as their strengths and areas for improvement in foot care delivery.

Leadership

Leadership requires one to be visionary, have good communication skills, be an advocate, and be a motivator to others (Canadian Nurses Association, 2002; Hamric et al., 2014). I demonstrated leadership through my ability to identify a need for change and then I developed a process and strategy to meet that goal. I believe that I have attained this competency through the identification and communication of the staff's learning and clinical practice needs to the Nurse Manager and Clinical Educator of CH. I developed a resource manual for CH that is an evidence-based educational tool that will help LPN staff meet their educational and professional needs. Based on the LPNs identification of their clinical practice needs I was able to provide them with the current foot care information in the form of a resource

manual. I envision this tool will ultimately improve the quality of the foot care provided to high risk residents' and positively impact clinical outcomes for these individuals.

Research utilization

Research utilization was demonstrated through the incorporation of evidence from the literature in the development of the resource manual for high risk older adults in a LTC agency (Hamric et al., 2014). I conducted extensive literature searches related to adult foot care practices in LTC agencies, completed information gathering across Canada, and learnt a vast amount of valuable information on my topic of interest. The information presented in the resource manual is current and evidenced-based, providing a required tool for LPN staff to use at their convenience.

Discussion

Throughout the practicum a comprehensive literature review was conducted. Although the literature contained a wealth of information on adult foot care, the majority of the studies reflected evidence pertaining to individuals with chronic illness, and in particular, those with diabetes mellitus. In comparison, information on the benefits of foot care in older adults who do not suffer from chronic disease was not as prevalent in the literature. Therefore, more research studies are needed to be completed on those healthy older adults to gain insight into how foot care practices impact them and their foot health. Also, the research studies surrounding the topic of foot care in the older adult were by majority descriptive with a limited number that were intervention and case studies. Therefore, more studies need to be conducted to provide stronger evidence (e.g. more varied study

designs and methods) on foot care practices in the older adult in LTC to gain more insight into this topic. There was also limited literature on the topic of nurses' foot care knowledge, foot care educational resource manuals for nurses in LTC, and how they may improve foot care practices. More research is needed in these areas to gain more insight into what is happening here in Canada and internationally.

The collaboration, consultations, and information gathering that were conducted throughout the practicum process were essential to the project. Throughout the practicum, I gained valuable information from several health professionals from organizations provincially and nationally. After speaking with many HCPs across Canada I could not find a resource manual that focused only on LPNs in LTC. Across Canada there were many foot care resources developed for the RN but not the LPN. I found this surprising, as the majority of those who provide direct care to older adults in LTC across Canada are LPNs. As described in the literature review, those who are in daily contact with the older adult in LTC are in the best situation to provide the suggested daily preventative foot care practices and techniques.

I also consulted with Dr. Pamela Ward, Faculty Member, Centre for Nursing Studies, Memorial University, who has expertise in the PN program curriculum. Her knowledge and experience assisted me in developing a manual that was suited to the LPNs background knowledge and education level. Ms. Anne Blackmore, Clinical Educator of CH, provided me with information in relation to the clinical guidelines, daily practice, current strengths and weaknesses of LPN foot care practices, as well as documentation processes at CH (personal communication, May 12, 2014). Her

closeness to this subject and knowledge regarding the LPNs, residents and their families played a crucial role in the development of my resource manual. The Council of Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) were also consulted to ensure that the information in the resource manual was accurate and based upon the educational level of the LPNs. The information from the CLPNNL focused on foot care practices, LPN scope of practice in NL, documentation standards as examples. This consultation was essential to my practicum project.

Implications for Nursing Practice

It is anticipated that the implementation of the resource manual will impact the foot care practices of the LPNs at CH resulting in increased staff confidence, competence, and knowledge of evidence-based foot care practices. The manual will provide the LPN staff with a structured educational tool to assist them in their daily clinical practice in the delivery of foot care to high risk older adults.

Limitations

Due to time constraints I was unable to implement the resource manual at CH. Upon agency approval, this resource manual will be implemented and provided to the LPN staff as in paper format, as well as in electronic format online on the Central Health Authority's intranet which all users can access at their nursing stations.

Other limitations included the challenge of finding literature and studies conducted that addressed use of a resource manual in LTC with the LPN staff. The majority of the literature was focused on the RN. It was also very challenging to find Canadian research conducted on foot care practices for the older adult in LTC.

Recommendations

Future research in Canada needs to be conducted in relation to the foot care practices of LPNs in LTC. In addition, research is needed for the development and implementation of resource manuals with these HCPs to assist their clinical practices.

Due to time constraints and the inability to implement the resource manual during the practicum I was also unable to complete an evaluation of the content and change in LPN foot care practice. In discussion with the Clinical Educator at CH, I was informed that it is the role of the Clinical Educator to assess and evaluate the teaching materials and resources utilized at CH (A. Blackmore, personal communication, June, 10th, 2014). It is anticipated that the Clinical Educator will be evaluating the resource manual by assessing LPN foot care practices and ensuring they are following the EBPs provided in the manual. She also will be completing informal discussions with LPN staff to determine how useful the resource has been in their daily clinical foot care practices. In addition, the Clinical Educator will be examining the high risk residents' foot care outcomes to determine if the manual had impacted resident outcomes.

It is anticipated that during the implementation of the resource manual I will introduce it to staff, discuss its purpose and content, and provide instructions on its use in clinical practice. During this time I plan to discuss evaluation of the manual with CH nurse manager and the clinical educator. I envision a post implementation evaluation for LPN staff that will be performed at intervals to assess its impact, continued use, and role in the LPNs foot care practices at CH.

Conclusion

The foot care resource manual I developed as part of the Master of Nursing program was developed utilizing Morrison, Ross, and Kemp's Model of Instructional Design (2004) and was based upon Knowles' Adult Learning Principles (1984). While this resource manual will assist to increase the confidence, knowledge, and clinical practices of LPNs providing foot care to high risk residents in LTC, it will also provide the materials they need in a quick, concise, easy to use manner. There is an abundance of research that supports the use of these evidence-based foot care preventative practices in the high risk older adult population. It is anticipated that by implementing the EBPs presented in this resource manual that the quality of resident foot care will increase and improve clinical outcomes in this group.

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Appendices

Appendix A – Levels of Care (Levels 3 and 4)

LEVELS OF CARE

CATEGORIES PERSONAL FUNCTIONS: The Applicant/Resident

Level 3

14. Is dependent for transfer or mobility.
15. Requires assistance to turn and move about in bed.
16. Is dependent for assistance with dressing, washing, grooming and bathing.
17. Has incontinence of bladder and/or bowel.
18. Requires supervision and assistance with eating or requires feeding.
19. Requires daily professional care.
20. May have sensory deficit which interferes with activities of daily living and requires ongoing assistance.

Level 4

21. See Medical Status/Level 4

LEVELS OF CARE

MENTAL/SENSORY/PERCEPTUAL: The Applicant/Resident

Level 3

32. May have severe cognitive impairment.
33. May have a sensory/perceptual deficit and even with adaptation needs ongoing assistance for understanding and expressing needs.
34. May present with management problems due to behavior, e.g., wandering, aggressiveness, hostility.
35. May demonstrate varying degrees of difficulty with orientation to place or person.

Level 4

36. Only responsive to tactile or painful stimuli or is non-responsive. See Medical Status/Level 4.

LEVELS OF CARE

MEDICAL STATUS: The Applicant/Resident

Level 3

44. Has medical problems which require continuous supervision and may require frequent professional intervention.

Level 4

May be technology dependent or need both a medical device to compensate for the loss of a vital body function and ongoing professional health care to maximize functioning or prevent further disability e.g. tracheotomy, enteral feed, vascular access device, mechanical ventilation.

Codes:

Independent: able to perform all aspects of task independently, may use special devices

Minimal Assistance: needs some assistance at all times in order to complete the task

Moderate Assistance: needs assistance at intervals to complete the task

Constant Supervision: needs constant supervision in order to complete the task

Dependent: unable to complete the task even when assistance is provided

Monitor: observe to check status or keep track of

Supervision: critical watching to give direction

Reference: Social Work Department, Central Newfoundland Regional Health Authority, p 2-4.

Appendix B - Letter of Support One



Mary Bursey
Assistant Professor
Memorial University
School of Nursing

December 2nd, 2013

Dear Ms Bursey,

I am writing to indicate my support for the academic project that Courtney Bruce is doing as part of the requirements of the MN degree. The development of a resource manual on the nursing management of foot care. She has titled her project 'The Development of a Resource Manual for Licensed Practical Nurses: Foot Care Program for High-Risk Older Adults in Long Term Care.' In doing so, this will provide an easily accessible foot care resource that all staff can utilize at any time and provide a basic knowledge in adult foot care.

The topic Courtney has chosen is very important, an adult foot care resource manual will enhance the care provided to residents' in Long Term Care. Central Health is moving toward the development of more e-learning self-directed educational materials that staff can take the initiative to independently complete in a non-stressful environment.

I look forward to working with Courtney on this project.

Sincerely,

Dana LeDrew
Nurse Manager Medicine (3A & 3B) Carmelite House
50 Union Street
Grand Falls Windsor, NL
A2A 2E1

Appendix B - Letter of Support Two



Mary Bursey
Assistant Professor
Memorial University
School of Nursing

April 14th, 2014

Dear Ms Bursey,

I am writing to indicate my support for the academic project that Courtney Bruce is doing as part of the requirements of the MN degree. The development of a resource manual on the nursing management of foot care. She has titled her project 'The Development of a Resource Manual for Licensed Practical Nurses: Foot Care Program for High-Risk Older Adults in Long Term Care.' In doing so, this will provide an easily accessible foot care resource that all staff can utilize at any time and provide a basic knowledge in adult foot care.

The topic Courtney has chosen is very important, an adult foot care resource manual will enhance the care provided to residents' in Long Term Care. Central Health is moving toward the development of more e-learning self-directed educational materials that staff can take the initiative to independently complete in a non-stressful environment.

I look forward to working with Courtney on this project.

Sincerely,

Krista Toms
Nurse Manager Carmelite House
50 Union Street
Grand Falls Windsor, NL
A2A 2E1

Appendix C - Resource Manual

Foot Care for High Risk Older Adults in Long Term Care

A Resource Manual for Licensed Practical Nurses

Developed by Courtney Bruce BN RN

Who can use this Resource Manual?

Maybe you are already knowledgeable and experienced in foot care practices and just wanted to review on the newest information. Perhaps you are a new graduate with little experience and wanted to learn more about high risk feet and foot care/footwear practices. Maybe you are working today and encountered a foot issue that you are unfamiliar with and needed some information and guidance. If you can relate to any of these scenarios then this manual may assist you.

This resource manual has been developed for use by Licensed Practical Nurses (LPNs) who are providing foot care to high risk older adults (65 years of age and older) living in a long term care agency (see Module 2 for more information on high risk criteria).

Remember! You must follow the agency policies and procedures when providing foot care to residents.

Why is this Resource Manual Important?

Impaired ambulation can make the difference between independence versus dependency, self-determination versus restricted choices, and engagement versus isolation (Mitty, 2009).

As a health care provider, you play a vital role in prevention, early identification, and reporting of foot health issues. A foot complication(s) such as an ulcer or ingrown nail can be life altering for the older adult. For example, the individual may have a higher risk of falls, a decreased quality of life, experience pain, and discomfort. Due to the severity of the foot complication, the individual may require an amputation or the complication may become life threatening such as, infection. Therefore, one cannot underestimate the great impact that quality foot care can have in the life of an older adult (Ricci, 2011; Stolt et al., 2012; Wright, 2009).

While there is extensive foot care information available in the literature and on various websites for foot health, this manual is designed to be a user friendly evidence-based, resource to assist you. It is divided into six modules for ease of use in daily practice.

The modules in this manual contain information pertaining to the high risk older adult, changes in the aging foot, pathologies of the skin, nails, and joints, as well as a list of additional resources.

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Myths and Misunderstandings

What are the Facts?

Myth 1. I should moisturize my resident's feet daily, including between their toes.

- Fact: **Never** moisturize between the toes. This can cause the skin to become wet, impair skin integrity and lead to splitting of the skin and open wounds.

Myth 2. Corns are contagious and can spread and multiply on the feet.

- Fact: Corns are caused by pressure and friction and **are not** contagious.

Myth 3. It is a good idea to have the resident go barefoot every now and again to "air out" their feet.

- Fact: If an older adult is high risk they should **never** go barefoot indoors or outdoors. Going barefoot increases risk of foot injuries.

Myth 4. Synthetic, cotton, and/or wool socks are all good choices for footwear.

- Fact: Cotton, and wool are both good choices for footwear because they are breathable and absorbant. Synthetics can promote fungal infections because they are not breathable and trap moisture.

Myths and Misunderstandings Continued

What are the Facts?

Myth 5. Soaking the feet for 15 minutes is a good foot practice.

- Fact: Some residents should never have their feet soaked (e.g. those with wounds) but for those who can, a maximum of 10 minutes is recommended.

Myth 6. Crossing the legs can decrease circulation but crossing the ankles is acceptable.

- Fact: Crossing the legs or the ankles can impair circulation. Both are not recommended practices.

Myth 7. Cold feet? Heating pads and heating blankets are a safe solution.

- Fact: Heating pads, heating blankets and hot water bottles all pose a burn risk and are **not** recommended. You can keep the resident's feet warm and protected by ensuring they wear appropriate footwear day and night.

The High Risk Older Adult

Introduction

An older adult who has risk factors that increase their chances of foot complications are classified as 'high risk'. Some risk factors include, but are not limited to, chronic illness, foot deformities, and improperly fitted footwear (CAWC, 2013; Ricci, 2011; Watkins, 2012). In this module you will learn about what classifies an older adult as high risk, what exactly increases their risks (contributing factors), and when to report to the Registered Nurse (RN).

Foot ulceration affects an estimated 15-25% of people with diabetes. One-third of amputations in Canada from 2011-2012 were performed on people reporting a diabetic foot wound (Canadian Diabetes Association, 2014).

Learning Objectives

By the end of this module you will be able to identify:

- 1 • The High Risk Older Adult
- 2 • Contributing Factors that Increase Foot Health Risks

The High Risk Older Adult

Table 1

High Risk Categories and Contributing Factors

High Risk	Contributing Factors
Aging	<ul style="list-style-type: none"> • See Module One for detailed information on the aging foot.
Diabetes Mellitus (DM)	<ul style="list-style-type: none"> • Vision impairments, peripheral vascular disease (PVD), atherosclerosis, heart disease, stroke, and/or neuropathy (nerve damage). • Slower healing rate and capacity to heal.
Peripheral Vascular Disease (PVD)	<ul style="list-style-type: none"> • Main risk is atherosclerosis. • Death of tissues related to decreased blood flow to the foot. • Slower wound healing.
Foot Deformity	<ul style="list-style-type: none"> • Foot deformities cause abnormally high levels of friction and pressure on the foot during normal daily activities and can lead to skin trauma (e.g. blisters) or foot ailments (e.g. corns).
Previous Ulcer or Amputation	<ul style="list-style-type: none"> • Often, risk factors that caused the initial ulcer or amputation are still present and chronic in nature (e.g.) individual with diabetic neuropathy that has had a foot ulcer.
Steroid Use	<ul style="list-style-type: none"> • These drugs suppress the immune system. • Increase the risk of infection.
Anti-coagulant Use	<ul style="list-style-type: none"> • These drugs increase bleeding risks.
Chronic Renal Disease	<ul style="list-style-type: none"> • Increased risk of infection due to uremia. • Dialysis therapy can increase risk of foot ulceration in conjunction with DM. • Anemia, which often accompanies chronic renal disease, is associated with poor tissue oxygenation and impaired wound healing.
Shoe Choice	<ul style="list-style-type: none"> • Heels greater than 2 inches, pointed toed shoes, and tight shoes all increase an individual's risk of foot issues (e.g.) foot deformities, bunions, claw toe.
Neuropathy	<ul style="list-style-type: none"> • See Module One for more detailed information on neuropathy. • The loss of sensation in the foot poses great risks (e.g.) if an individual cannot feel their feet they could have an injury and not even realize it.

Note. Information taken from various sources (see Bibliography).

Assessment of the High Risk Older Adult's Feet

The high risk older adult needs to have his or her feet assessed and cared for on a daily basis to prevent foot complications. Here are just some of the questions you may ask yourself when assessing their feet...

- What is the individual's health history? (e.g.) Has he/she had an ulcer before? Do they have any chronic disease(s)? Do they smoke?
- What is the skin condition? (e.g.) Is there edema (swelling), toenail pathologies, or redness present?
- What is the musculoskeletal condition? (e.g.) Are there foot deformities present?
- What is the neurological (sensory) condition? (e.g.) Have they had monofilament testing (nerve testing)? Does the individual express feelings of tingling, burning, or pain in their feet?
- Vascular Condition? (e.g.) Are the posterior tibial and dorsalis pedis pulses present? How is the capillary refill? What is the foot temperature? Is the temperature/pulses equal on both the right and left foot?

People with diabetes are over 20 times more likely to be hospitalized for a non-traumatic lower limb amputation compared to the general population (Canadian Diabetes Association, 2014).

Note. Information taken from various sources (see Bibliography).

The feet of the high risk older adult need to be assessed on a daily basis to prevent foot complications (Registered Nurses Association of Ontario, 2007).

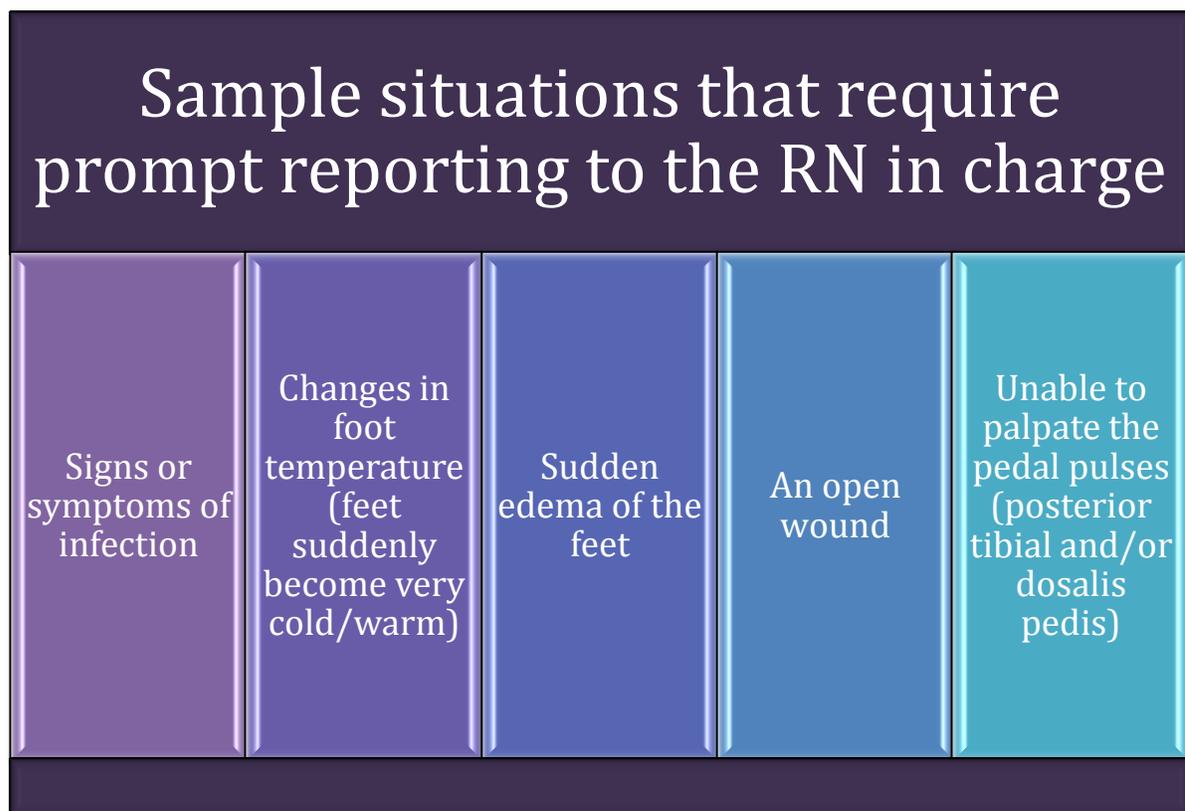


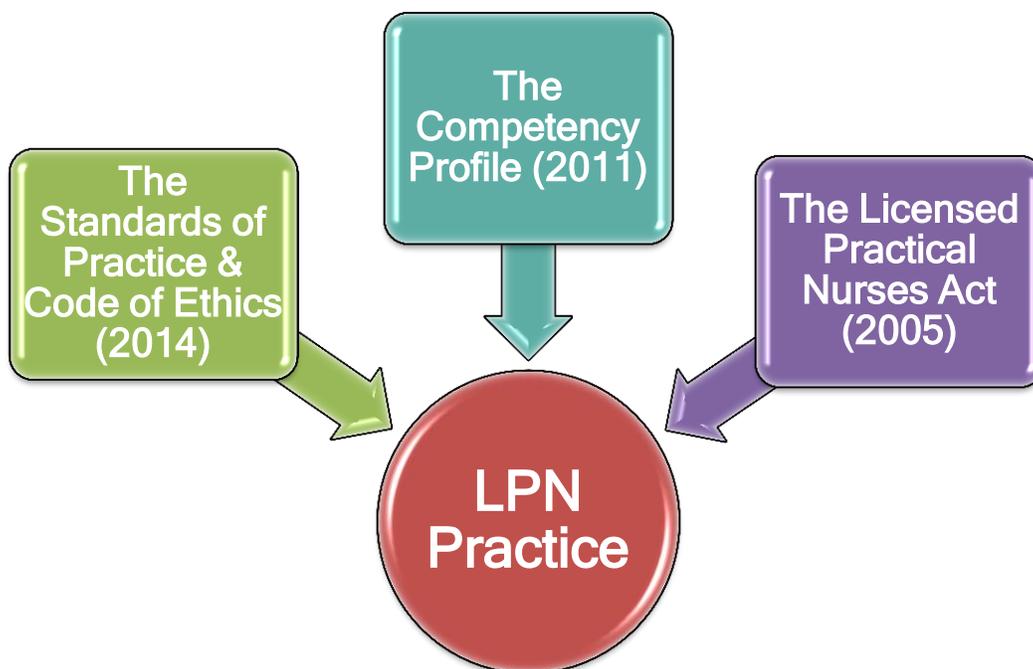
Figure 1. Situations Requiring Prompt Reporting to RN

More information can be found via Cleveland Clinic available from:
http://my.clevelandclinic.org/disorders/diabetes_mellitus/hic_foot_and_skin_related_complications_of_diabetes.aspx

Note. Information taken from various sources (see Bibliography).

When to Report

The Council for Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) supports and encourages Licensed Practical Nurses (LPNs) to practice within their professional scope of practice, clinical parameters defined by their employers through policies and procedures and their own individual competencies. They are expected to practice within the following documents:



Licensed Practical Nurses are accountable to recognize situations where the needs of the client are beyond their individual scope of practice or competency. Therefore, they are to consult with the appropriate health care provider to ensure the client receives safe, competent, and ethical care (LPN Act 2005). It is important that LPNs and employers recognize that the client needs and practice context (the setting in which practice takes place) determine the right nurse to engage in providing foot care (CLPNNL, 2014).

Documentation

Documentation is an integral part of nursing practice. It provides an accurate account of the professional services provided to clients when completed in adherence with the LPN Act and Regulations, policies and procedures of the employing agency, and professional accountability as outlined in the CLPNNL Standards of Practice (2014). A LPN documents only the care he/she provides except in situations where there is a dedicated recorder (CLPNNL).

A LPN maintains documentation that is:

- Clear, concise, and comprehensive
- Accurate and truthful
- Entered in a timely manner
- Client focused and confidential

(Reference: CLPNNL, 2014).

What should be documented?

1. *Assessment.* This includes subjective data (statements or feedback from the resident e.g. resident states, “I have pain in my toe”) and objective data (information that is observed e.g. a reddened toe).
2. *Planning.* Identification of priorities in the resident’s care. Did you notify the RN of an assessment finding such as edema or a wound? What actions will be taken next?
3. *Implementation.* What was done? (e.g. interventions and/or teaching).
4. *Evaluation.* What were the outcomes? What was the resident’s response? Did the intervention work or does it need to be reviewed/revise for the resident’s plan of care? What follow up is needed?

(References: Association of Registered Nurses of Newfoundland and Labrador, 2010; Barry, 2014; CLPNNL, 2014).

Always follow your agency's policies and/or guidelines on documentation of foot care practices.

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The Aging Feet of the Older Adult

Introduction

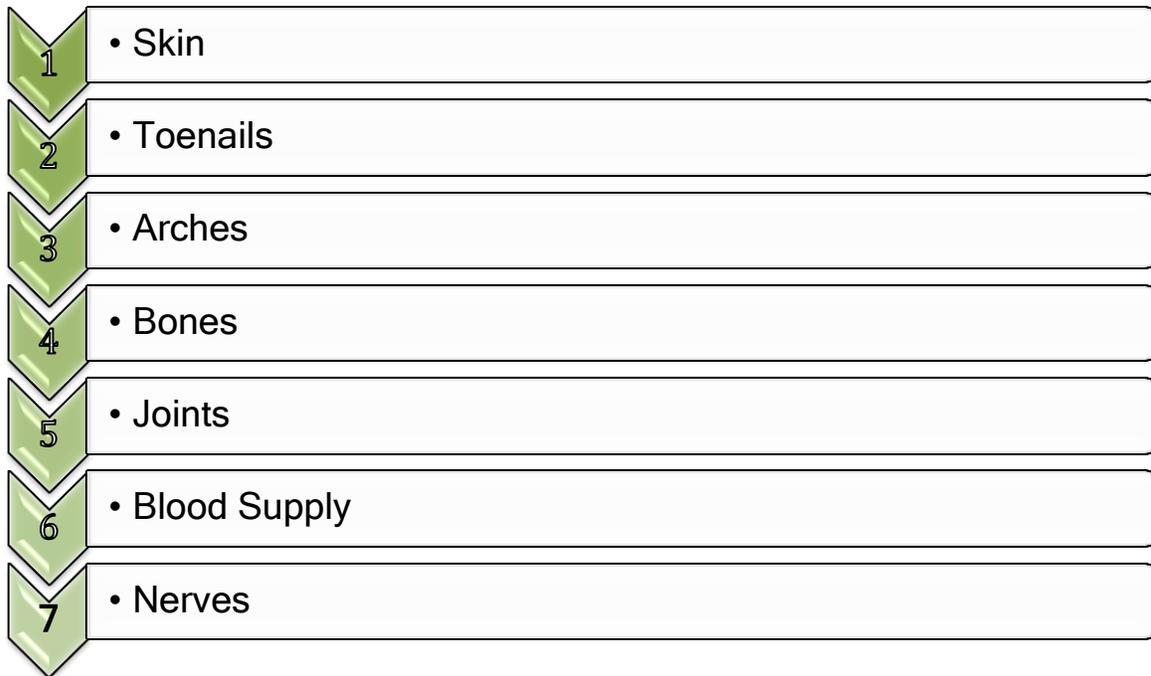
As individuals age, many physiological changes take place in the body (e.g. mobility impairments, toenails thicken, bony changes in the feet). These changes can impact the ability to provide self-care, foot health, and the foot care/footwear needs of the older adult (Helfand, 2009; Watkins, 2012).

An average of 90% of those individuals 65 years of age and older will experience foot pain that alters their independent activity (Helfand, 2009).

Learning Objectives

By the end of this module you will be able to discuss:

- (a) age related changes
- (b) nursing preventative practices for the older adult's feet which includes:



There are many factors, outside those to be discussed in this module, which are common to aging and impact the older adult's ability to provide self-care (including self-care of their feet). Some of these factors also affect the older adult physically (e.g. altering their body's ability to heal). Below is a figure identifying some of these factors with examples.

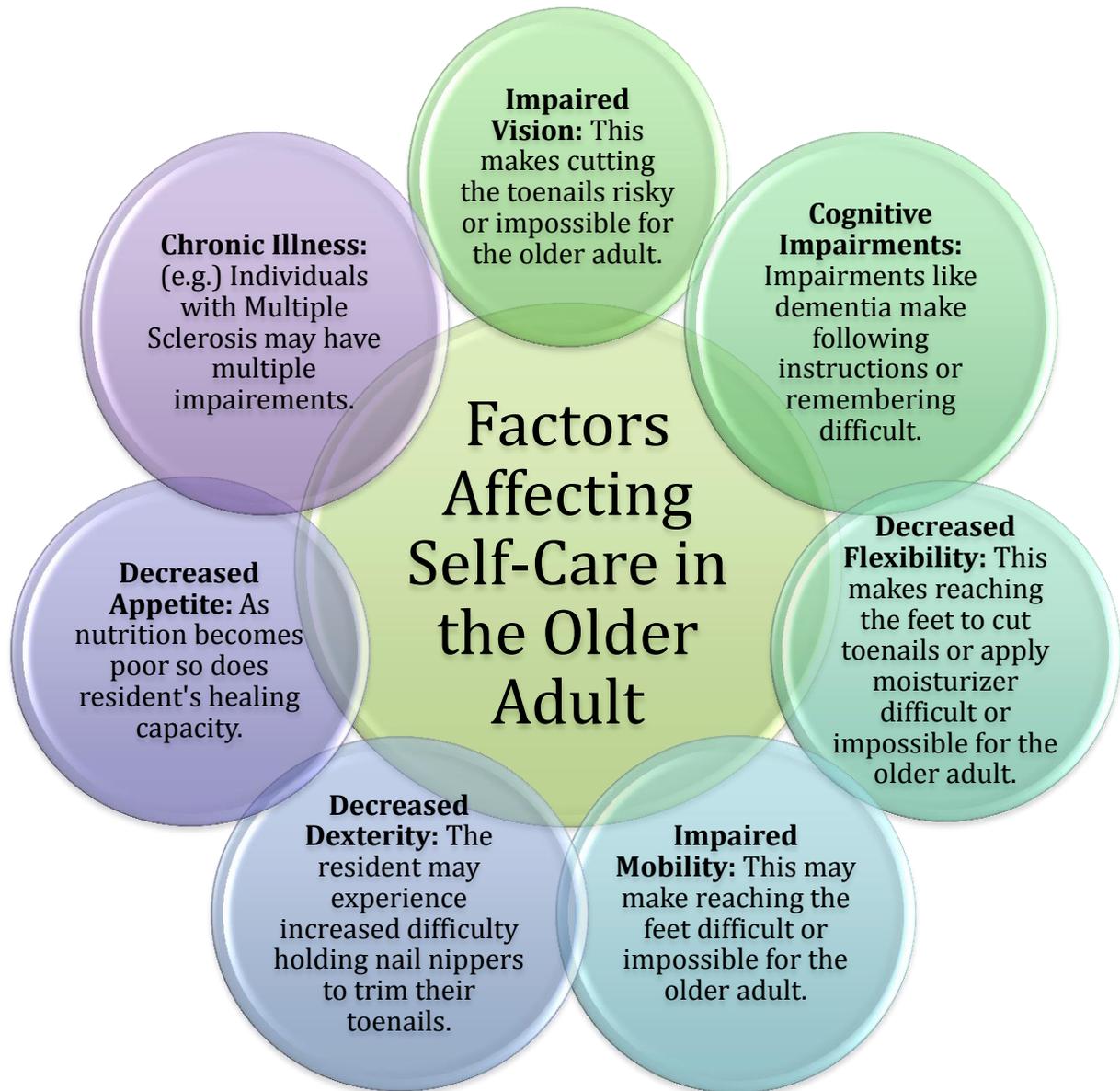


Figure 9. Factors Affecting Self-Care in the Older Adult.
Note. Information taken from various sources (see Bibliography).

Preventative Foot Care Practices

Preventative foot care, including the early identification of foot problems and intervention(s) to prevent problems from becoming more severe, can avert many amputations (National Diabetes Education Program, 2000). The box below

contains four basic steps to making preventative foot care a part of your daily practice.

Four Basic Steps for Preventative Foot Care in Your Practice

1. Early Identification
2. Early Diagnosis
3. Early Intervention
4. Resident Education

Reference: National Diabetes Education Program, 2000.



Age Related Changes in the Skin

The skin assists in regulating body temperature, protecting the body, and enables individuals to feel pleasure, pain, and other stimuli in the external environment (Patton & Thibodeau, 2013). The skin becomes dryer with age, as a result of decreasing functioning sebaceous glands.

Did you Know...

- The older adult's skin has a slower healing rate due to changes in the immune system that accompanies aging.
- Wrinkles begin to appear due to loss of elasticity.
- The skin's pigment may begin to change with contributing factors such as the development of broken blood vessels and/or spider veins. The skin also becomes paler in color.
- The fat pads present under the ball and heel of the foot, which provide cushioning, begin to thin out. The thinning of these fat pads can lead to discomfort when weight bearing, for example, walking.

Normal healing rates in the older adult's skin may be up to four times slower than that of younger patients (Ricci, 2011).

Note. Information taken from various sources (see Bibliography).

Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based practice intervention that guides nursing care of the skin of the resident's feet.



Figure 1. Nursing Interventions for Resident Skin Care

Figure 1 based on information from Anderson, White, & Kelechi (2010), Beeckman, Duaso, Rajpaul, & Tremlett (2011), Bentley (2008), Canadian Association of Wound Care (2013), Canadian Podiatry Medical Association (2013), Canadian Diabetes Association (2013), Harvard Health Publications (2009), Helfand (2009), Inlow (2003), Lavery & Fontaine (2013), Lyman & Vlahovic (2010), Mayo Clinic (2013), National Diabetes Education Program (2012), Sibbald, Campbell, Coutts, & Queen (2003), Veterans Affairs Canada (2012), and Wright (2010).

Age Related Changes in the Toenails

The toenails provide protection from trauma to the tips of our toes. In older adults the toenails begin to become more brittle and dry due to decreased vascularity.

This decreased vascularity can also lead to the nails becoming thicker and

growing more slowly (Cleveland Clinic, 2014; Helfand, 2009; Patton & Thibodeau, 2013).

The older adult's mobility, independence, and well-being all increase with good quality foot care (Anderson, White, and Kelechi, 2010; Helfand, 2009; Stolt et al., 2011; Wright, 2009).



Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based practice intervention that guides nursing care of the toenails of the resident's feet.

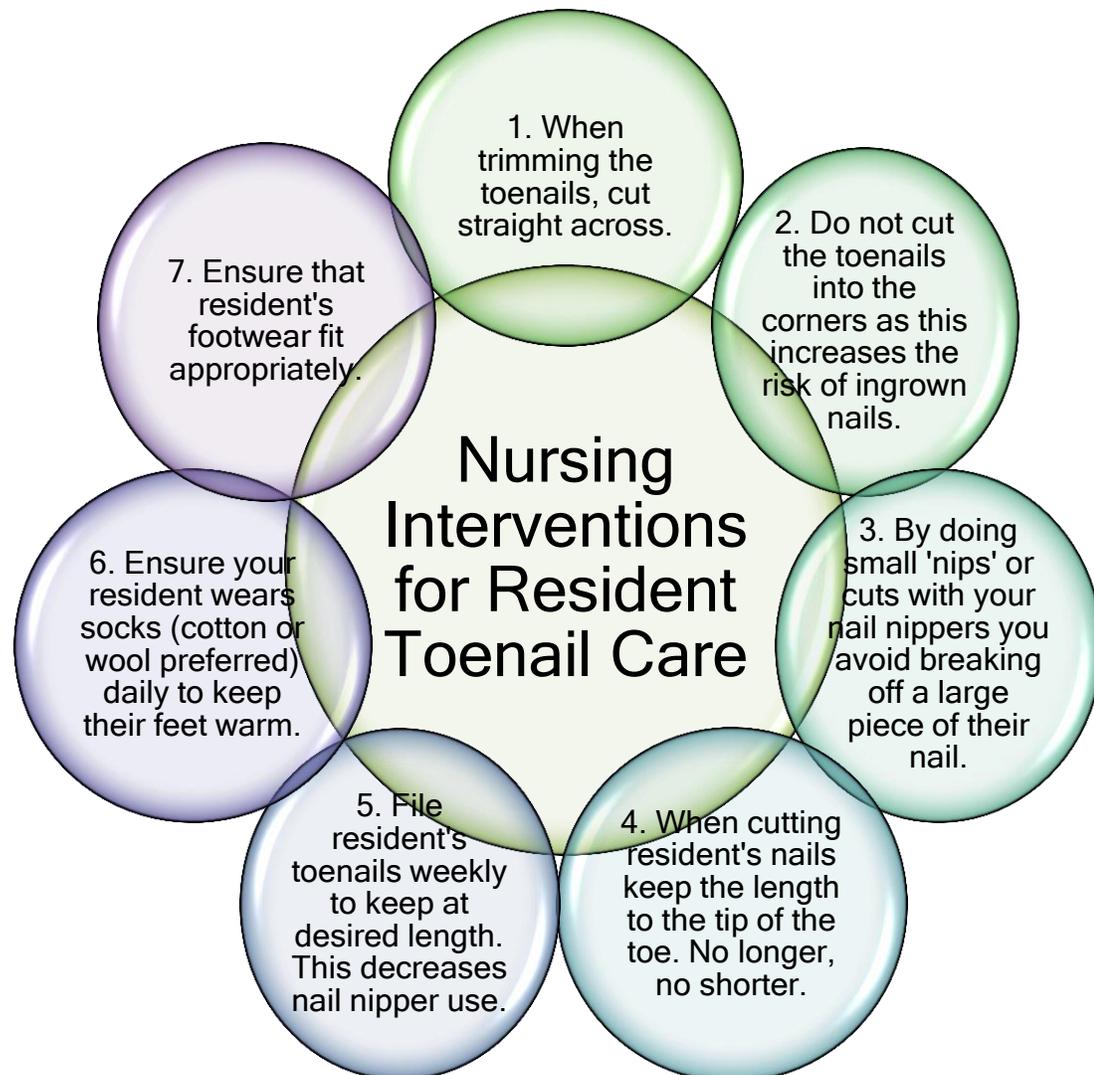


Figure 2. Nursing Interventions for Resident Toenail Care

Figure 2 based on information from Bennett (2006), Canadian Association of Wound Care (2014), Canadian Diabetes Association (2013), Capital Health (2003), Goldfaden (2008), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), and Wright (2010).

Age Related Changes in the Arches

The arches enable the foot to support the weight of the body while providing an ideal distribution of body weight over the soft and hard tissues of the foot. The muscles of the foot play a key function in stabilizing the arches position (Patton & Thibodeau, 2013).

Did you Know...

With increasing age, the foot begins to lose its shape from weakening and degenerating muscle fibers, tendons, and ligaments. The weakening arches result in the foot becoming wider and longer in shape and size over time.



Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based practice intervention that guides nursing care of the arches of the resident's feet.

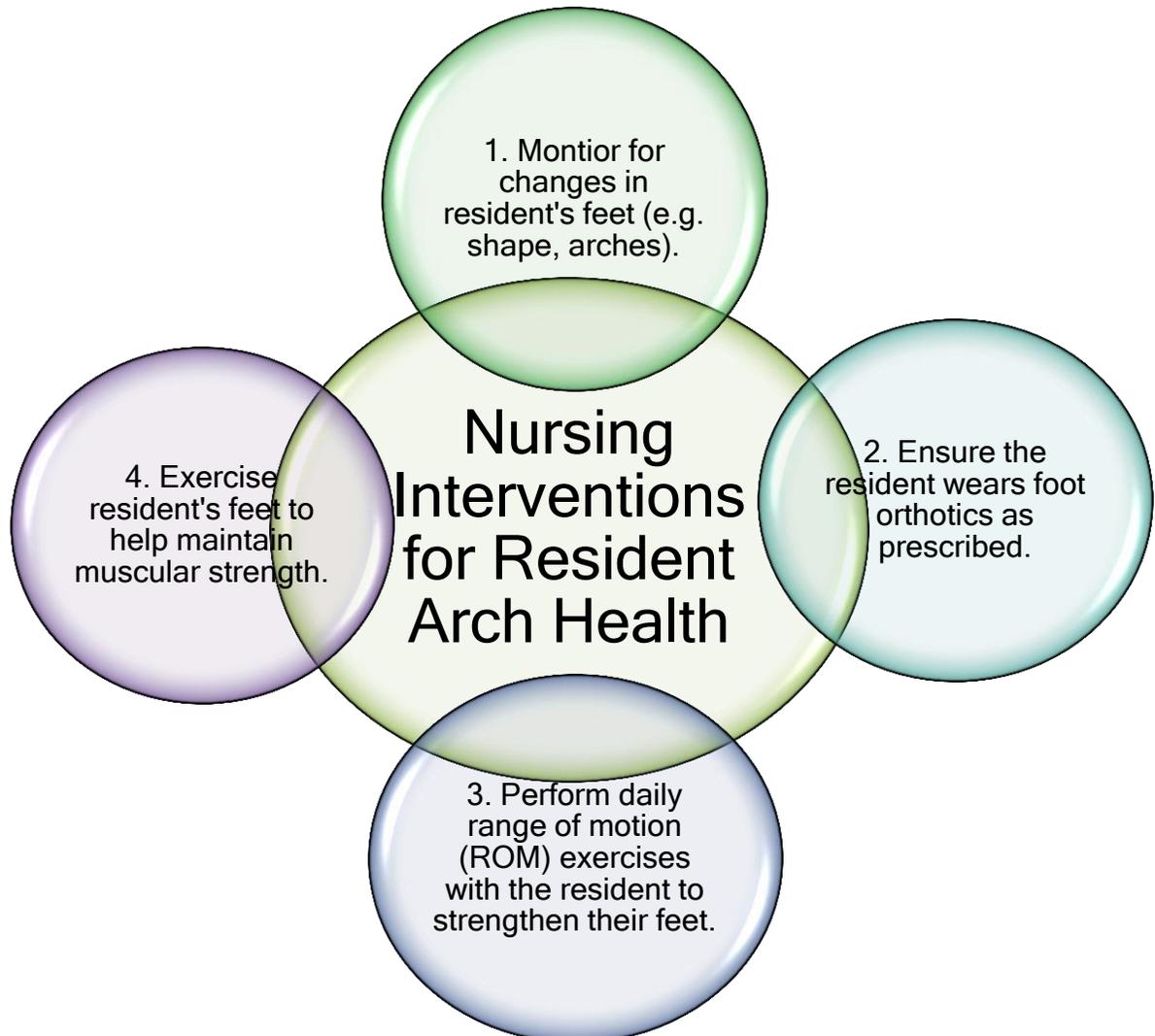


Figure 3. Nursing Interventions for Resident Arch Health

Figure 3 based on information from Bentley (2008), Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Caselli & George (2003), Helfand (2009), Lyman & Vlahovic, 2010; National Diabetes Education Program, 2012; Registered Nurses Association of Ontario (2004), and Veterans Affairs Canada (2012).

Age Related Changes in the Foot Bones

There are 26 bones in each foot that support the weight of the adult's body during activities such as, walking and running. These bones provide attachment points and leverage for the muscles of the feet, which aid in movement. Age related

changes over time causes decreased bone mass from gradual bone loss leading to brittle bones and/or osteoporosis. This can put the older adult at risk for fractures and broken bones in the body, including those of the foot (Patton & Thibodeau, 2013).

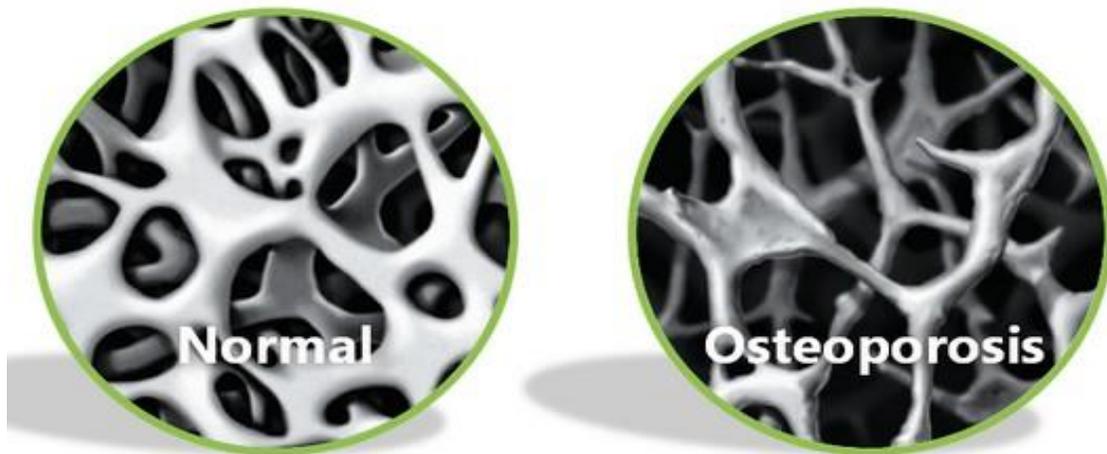


Figure 4. Normal Bone Tissue Versus Osteoporosis Bone Tissue. From:

www.osteoporosis.ca

More information can be found via Mayo Clinic available from:

<http://www.mayoclinic.org/healthy-living/adult-health/in-depth/bone-health/art-20045060>

And/or Osteoporosis Canada via: <http://www.osteoporosis.ca/osteoporosis-and-you/what-is-osteoporosis/>

Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based practice intervention that guides nursing care of the bones of the resident's body/feet.



Figure 5. Nursing Interventions for Resident Bone Health

Figure 5 based on information from Bentley (2008), Canadian Diabetes Association (2013), Caselli & George (2003), Health Canada (2011), Osteoporosis Canada (2014), Registered Nurses Association of Ontario (2004), and Springett & White (2002).

Age Related Changes in the Joints

In comparison to the bones, the joints are not rigid. The joints of the skeletal system hold bones together in a way that allows for flexibility and movement. A

joint is the point of contact between two bones, bone and cartilage, or bone and teeth (Patton & Thibodeau, 2013).

Did you Know...

- Bunions, claw toes, and other foot deformities are more likely in advancing age due to decreased muscular tone and resulting imbalances in the foot.
- The older adult is also more likely to develop chronic conditions that affect the joints such as, arthritis, that can cause stiffness and decreased range of motion of the ankles and toes.

More information can be found via Cleveland Clinic available from:

http://my.clevelandclinic.org/anatomy/musculoskeletal_system/hic_normal_structure_and_function_of_the_musculoskeletal_system.aspx

Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based

practice intervention that guides nursing care of the joints of the resident's feet.

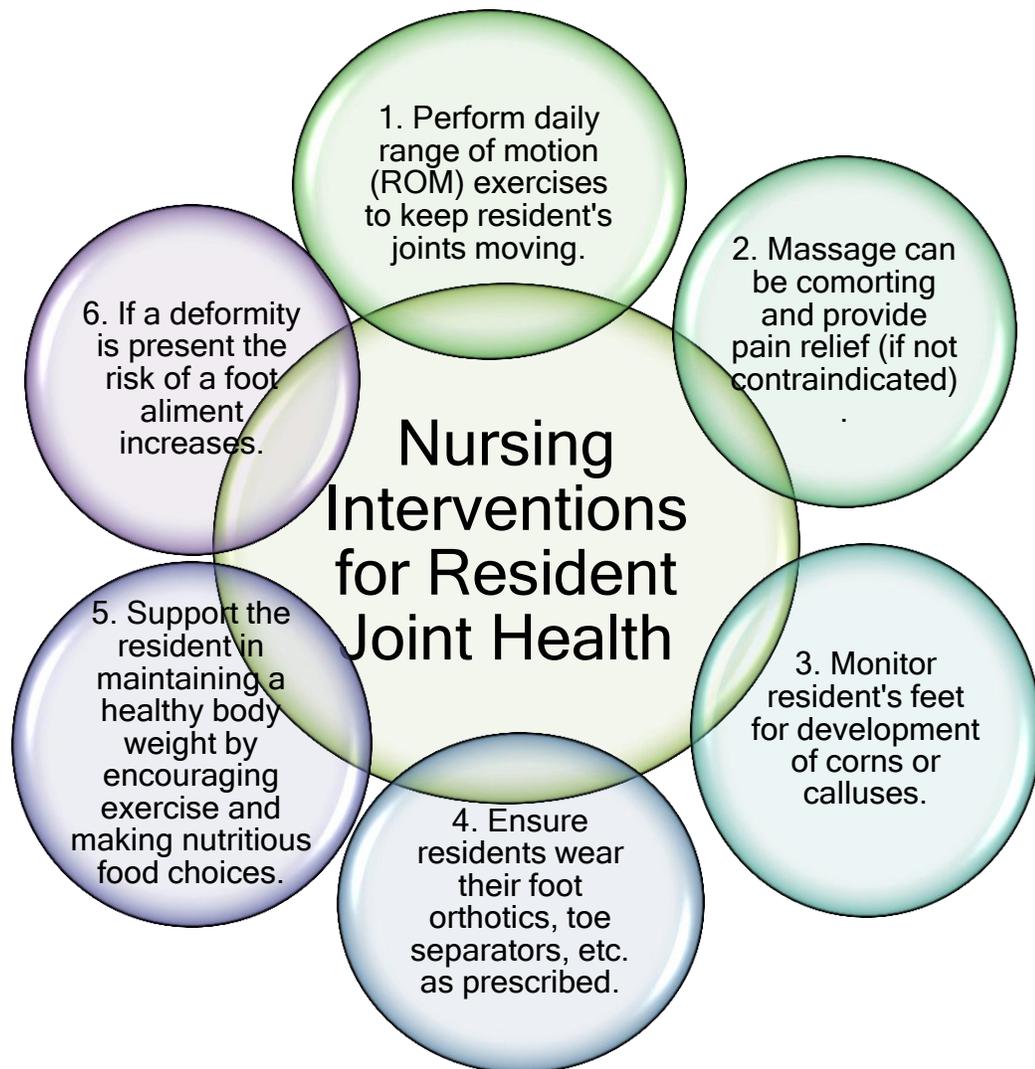


Figure 7. Nursing Interventions for Resident Joint Health

Figure 7 based on information from Bennett (2006), Caselli & George (2003), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Health Canada (2011), Mitty (2009), Springett & White (2002), and Turns (2013).

Health Canada's: Eating Well with Canada's Food Guide is available from:

<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>

Age Related Changes in the Blood Supply to the Feet

The blood vessels provide the structure to which blood can flow to and from the heart and exchange nutrients and waste in the tissues of the body. Blood carries with it oxygen, nutrients, and hormones, and takes away waste products. This is important to every tissue in the body including those of the foot (Patton & Thibodeau, 2013).

Did you Know...

- The blood supply to the feet may become decreased or limited due to atherosclerosis of the blood vessels in the legs and feet. This can negatively affect an individual's foot health since the blood is needed to carry important elements to the tissues of the foot.
- Decreased venous blood return is also common in the older adult and can result in edema of the lower legs, ankles, and feet.
- Issues with blood supply to the feet increase ulcer risk, particularly if the individual is unable to verbally report that he/she is experiencing pain.

More information can be found via Harvard Health available from:

http://www.health.harvard.edu/newsletters/Harvard_Health_Letter/2011/November/feet-and-falling

Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced-based practice intervention that guides nursing care to promote circulation in the resident's lower legs and feet.

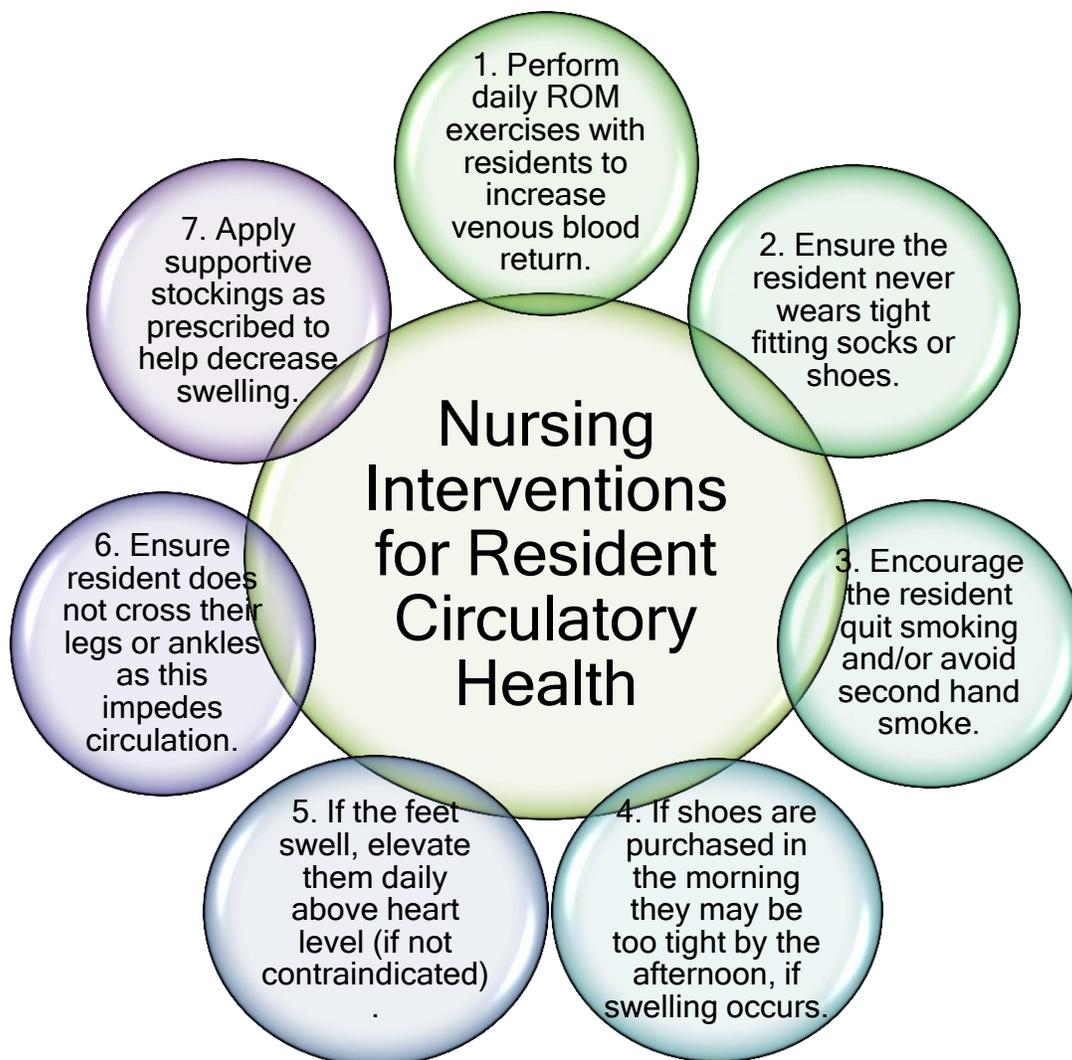


Figure 6. Nursing Interventions for Residents Circulatory Health

Figure 6 based on information from Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Medical Association (2013), Capital Health (2003), Caselli & George (2003), Helfand (2009), Inlow (2003), National Diabetes Education Program (2012), National Diabetes Education Program (2000), and Veterans Affairs Canada (2012).

Age Related Changes in the Nerves

The nerves of the foot assist in sensory function (sensation) and motor function (movement). They send signals to the muscles and glands via the cranial and spinal nerves. As a result of the aging process these nerves begin to atrophy or break down with age. This loss of nerve tissue effects nerve function and can lead to loss of sensation and/or pain and discomfort in the foot. Chronic illnesses such as, diabetes mellitus and peripheral vascular disease (PVD) negatively impact the function and health of the nervous system (CDC, 2012; Wright, 2009).



More information can be found via Cleveland Clinic available from:

http://my.clevelandclinic.org/healthy_living/foot-ankle/hic-footwear-tips-for-evaluating-proper-fit.aspx

http://my.clevelandclinic.org/orthopaedics-rheumatology/diseases-conditions/proper_footwear.aspx

Care of the Older Adult's Feet

The figure below contains priority nursing interventions in providing resident foot care. Each outer circle contains an evidenced based practice intervention that guides nursing care of the nerves of the resident's feet.



Figure 8. Nursing Interventions for Residents Nerve Health

Figure 8 based on information from Bentley (2008), Canadian Diabetes Association (2013), Etnyre et al. (2011), Harvard Health Publications (2009), Registered Nurses Association of Ontario (2004), Sheridan (2012), Turns (2013), and Wright (2010).

Resident and Family Education

Accompanying the daily foot care clinical practices described in this module is the paramount role of resident education. Since many residents in long term care have self-care deficits and/or impairments (e.g. dementia) it is important that the nurse educates the resident, as well as their family on evidenced based foot care practices. Figure 9 contains important topics for discussion.

Educate the resident and their family regarding...



Dry skin and it's prevention



Changes in their toenails and preventative care



Age related changes in the arches and preventative care



Having their feet measured every time shoes are purchased



Buying footwear in the afternoon when their feet are most swollen



Changes in the nerves and preventative care.

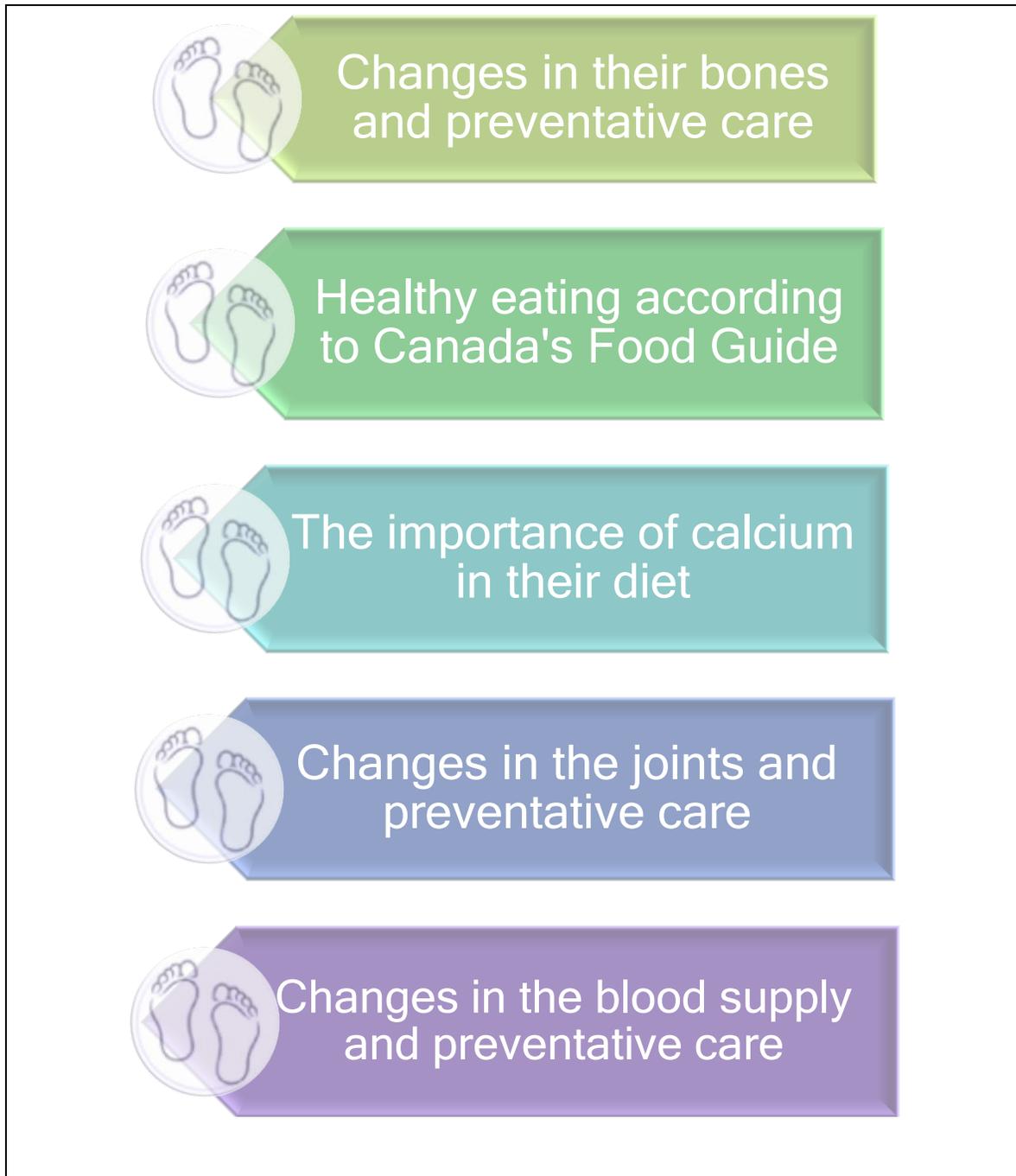
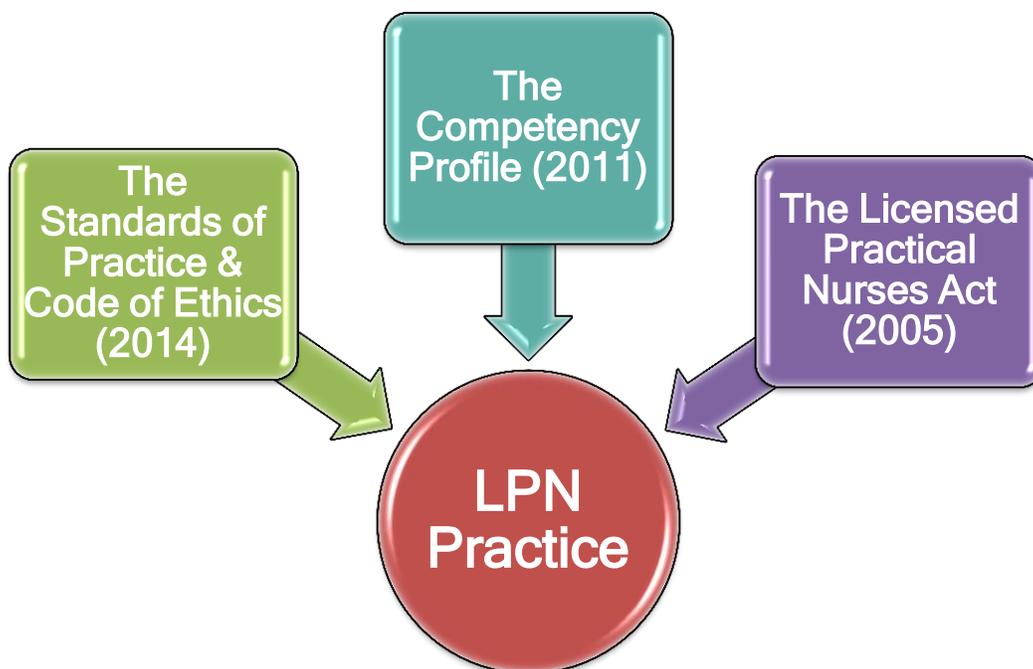


Figure 9. Resident and Family Foot Care Education

When to Report

The Council for Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) supports and encourages Licensed Practical Nurses (LPNs) to practice within their professional scope of practice, clinical parameters defined by their employers through policies and procedures and their own individual competencies. They are expected to practice within the following documents:



Licensed Practical Nurses are accountable to recognize situations where the needs of the client are beyond their individual scope of practice or competency. Therefore, they are to consult with the appropriate health care provider to ensure the client receives safe, competent, and ethical care (LPN Act 2005). It is important that LPNs and employers recognize that the client needs and practice context (the setting in which practice takes place) determine the right nurse to engage in providing foot care (CLPNNL, 2014).

Documentation

Documentation is an integral part of nursing practice. It provides an accurate account of the professional services provided to clients when completed in adherence with the LPN Act and Regulations, policies and procedures of the employing agency, and professional accountability as outlined in the CLPNNL Standards of Practice (2014). A LPN documents only the care he/she provides except in situations where there is a dedicated recorder (CLPNNL).

A LPN maintains documentation that is:

- Clear, concise, and comprehensive
- Accurate and truthful
- Entered in a timely manner
- Client focused and confidential

(Reference: CLPNNL, 2014).

What should be documented?

5. *Assessment.* This includes subjective data (statements or feedback from the resident e.g. resident states, “I have pain in my toe”) and objective data (information that is observed e.g. a reddened toe).
6. *Planning.* Identification of priorities in the resident’s care. Did you notify the RN of an assessment finding such as edema or a wound? What actions will be taken next?
7. *Implementation.* What was done? (e.g. interventions and/or teaching).
8. *Evaluation.* What were the outcomes? What was the resident’s response? Did the intervention work or does it need to be reviewed/revised for the resident’s plan of care? What follow up is needed?

(References: Association of Registered Nurses of Newfoundland and Labrador, 2010; Barry, 2014; CLPNNL, 2014).

Always follow your agency’s policies and/or guidelines on documentation of foot care practices.

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Skin Pathologies of the Older Adult's Feet

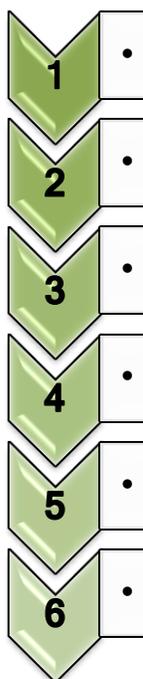
Introduction

This module will identify the **six** common skin pathologies with the related signs and symptoms, and contributing factors observed in the older adult. Relevant prevention strategies and nursing interventions will be described including the importance of reporting to the most appropriate health care provider.

Learning Objectives

By the end of this module you will be able to discuss:

- (a) signs and symptoms
- (b) risks
- (c) preventative practices in the older adult for:



What is Dry Skin?

Dry skin develops due to a depletion of moisture in the skin. This can occur across all age groups, but is more commonly seen in the older adult. It is a result of a decreased number and function of sebaceous glands in the skin.

What causes dry skin?

- Occurs as a natural part of aging.
- Walking barefoot.
- Wearing sandals.
- No daily application of moisturizer.
- Bathing in hot water (can deplete natural oils of the skin).
- Dehydration.

What are the signs and symptoms of dry skin?

- Pruritus (itchiness).
- Hardening of the skin.
- Dry, flaky, and/or scale like skin.
- Fissures or cracks forming on the heels.

The skin prevents dirt and bacteria, which may cause infection, from entering the body (Wright, 2009).

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

- Moisturize resident's feet daily, preferable after bathing.
- Ensure residents always wear socks (even in bed when appropriate).
- Ensure resident wears footwear that completely covers their foot.
- Wash resident's feet in warm water to help maintain the natural oils of their skin. A safe water temperature is between 38-40 degrees Celsius.
- Ensure the resident drinks water regularly to avoid dehydration. More information can be found via the Institute of Medicine available from:

<http://www.iom.edu/reports/2004/dietary-reference-intakes-water-potassium-sodium-chloride-and-sulfate.aspx> (See Electrolyte and Water Table PDF).

Tips	To	Remember
<ul style="list-style-type: none"> • Wash the resident's feet in warm water (not hot) to maintain the skin's natural oils. • Limit resident's bath/soaking time to 5-10 minutes when possible. 	<ul style="list-style-type: none"> • Moisturize resident's feet immediately after washing them. • To dry feet well in particular between the toes. • Ensure hydration. 	<ul style="list-style-type: none"> • Ensure residents never go barefoot indoors or outdoors. • Apply moisturizer daily.

Dry skin section based on information from Anderson, White & Kelechi (2010), Bennett (2006), Canadian Diabetes Association (2013), Canadian Podiatry Association of Canada (2013), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Harvard Health (2011), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), Ricci (2011), Sibbald, Campbell, Coutts, & Queen (2003), Springett & White (2002), Turns (2013), Wright (2010), and Wright (2009).

More information can be found via Cleveland Clinic available from:

http://my.clevelandclinic.org/disorders/dry_skin/derm_overview.aspx

What is Hyperhidrosis?

Hyperhidrosis or wet skin is excessive physiological and emotional sweating (e.g. sweating caused by emotional stress) that can affect the hands, feet, and axillae. Individuals with hyperhidrosis are more susceptible to infections.

What causes Hyperhidrosis?

- This can occur because of a chronic condition such as: obesity, gout, menopause, tumors, diabetes mellitus, and hyperthyroidism.
- Sometimes there is no apparent cause for hyperhidrosis.

What are the signs and symptoms of Hyperhidrosis?

- Maceration of the skin, often between the toes (soft white looking skin).
- Shiny, wet, and/or sweaty surface on the skin (see Figure 2).

More information can be found via Canadian Dermatology Association available from: <http://www.dermatology.ca/skin-hair-nails/skin/hyperhidrosis/>

And/or Cleveland Clinic available from:

<http://my.clevelandclinic.org/heart/services/thoracic/hyperhidrosis.aspx>

And/or Mayo Clinic available from: <http://www.mayoclinic.org/diseases-conditions/hyperhidrosis/basics/definition/con-20030728>

Nursing Interventions

- The risk of developing hyperhidrosis is decreased if the individual maintains a healthy weight and participates in regular exercise. More information on exercise and healthy weight for older adults can be found via Center for Disease Control and Prevention available from:
<http://www.cdc.gov/physicalactivity/everyone/guidelines/olderadults.html>
and <http://www.cdc.gov/healthyweight/assessing/bmi/Index.html>
- Some individuals may develop this condition for a period of time and then recover such as menopause (after menopause completes naturally or with medications, the woman may recover from hyperhidrosis), hyperthyroidism (after diagnosis and medication individuals may recover from hyperhidrosis), and tumors (if the tumors are removed or treated hyperhidrosis may subside).
- Some individuals will have hyperhidrosis with no known cause.

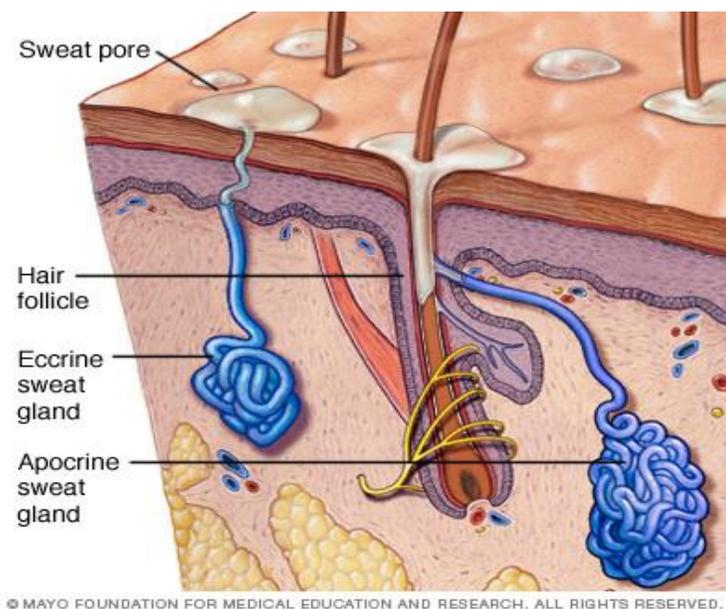


Figure 1. Sweat Glands in the Skin. From: www.mayoclinic.com

Preventing Hyperhidrosis can be a Balancing Act!

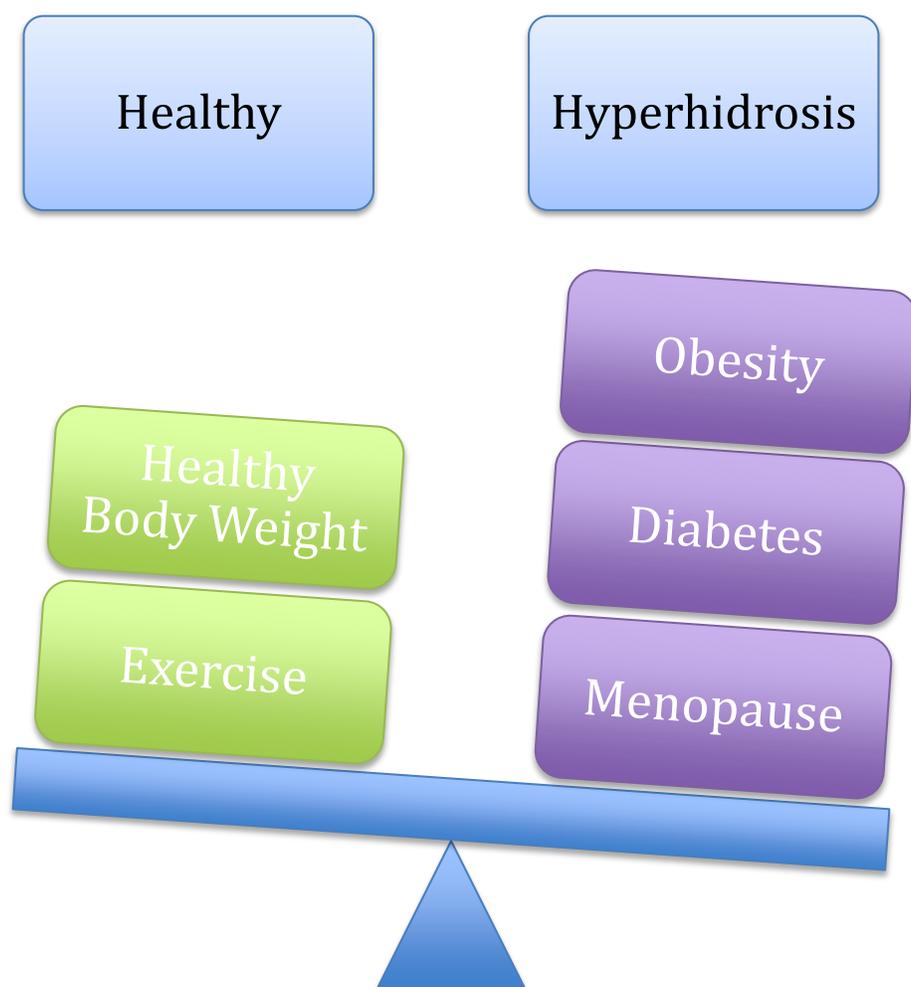


Figure 2. Preventing Hyperhidrosis-A Balancing Act.

Hyperhidrosis section information based on Bennett (2006), Canadian Podiatry Association of Canada (2013), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Habif (2009), Hyperhidrosis Organization (2014), James, Berger, & Elston (2011), Lyman & Vlahovic (2010), National Diabetes Education Program (2012), Springett & White (2002), Turns (2013).

What is a Callus?

A callus is an area of the skin that becomes thickened as a result of excess pressure and/or friction. They are commonly found on the sole of the foot and under the bones of the toes where pressure is most often exerted from.

What causes a callus?

- Pressure and friction are **two** of the main contributing factors to developing a callus.
- High arches place increased pressure in specific areas of the foot creating an imbalance. These higher-pressure areas often develop calluses.
- Tight footwear creates pressure and friction with movement.
- Loss of fat padding in the foot, common with aging, increases pressure over the bony prominences.
- Excessive friction and pressure over bony prominences.
- Walking barefoot dries the skin and exposes it to increased friction, which stimulate callus growth.

What are the signs and symptoms of calluses?

- Yellow colored thick/hard areas on the foot.
- Usually flat and rounded in shape.
- Usually painless but can cause discomfort when walking or standing in some individuals.

Foot deformities increase the risk of developing a callus because they imbalance the foot, causing pressure areas (Watkins, 2012).

Nursing Interventions

- Moisturize the resident's feet daily after bathing.
- Ensure the resident wears their prescribed orthotics for high arch conditions to alleviate pressure areas.
- Ensure residents wear footwear that is the correct size and fit for the foot. Check that their footwear is not tightly fitting or narrow in the toes. This allows room for the foot to move within the shoe and decreases pressure and friction of the foot against the shoe.
- Place padding (prescribed or over the counter orthotics as appropriate) inserts into resident's shoes to cushion the feet where loss of fat pads has taken place. These pads will alleviate pressure and friction areas.
- Ensure residents' wear appropriately fitted socks and shoes. It is recommended that the high-risk older adult wear shoes indoors and outdoors to decrease risk.

- More information can be found via Mayo Clinic available from:
<http://www.mayoclinic.org/diseases-conditions/corns-and-calluses/multimedia/callus/img-20007285>

Tips	To	Remember
<ul style="list-style-type: none"> • Check to see if the resident's shoes fit properly and accommodate for any deformities (e.g.) claw toe, bunions. • Educate the resident and their family about having their feet measured at each new shoe purchase. 	<ul style="list-style-type: none"> • Moisturize residents feet right after washing. Be sure to moisturize daily and never apply lotion between their toes. • Monitor your residents for any changes in foot shape. • Ensure residents never go barefoot indoors or outdoors. 	<ul style="list-style-type: none"> • By wearing footwear at all times, resident's feet are protected from friction and pressure; both of which cause corn formation. • Use a Diamond Deb or emery board to file down a callus (if appropriate).

Callus section information based on Anderson, White & Kelechi (2010), Bennett (2006), Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Association of Canada (2013), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Harvard Health (2011), Lyman & Vlahovic (2010), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), Ricci (2011), Sibbald, Campbell, Coutts, & Queen (2003), Springett & White (2002), Turns (2013), Watkins (2012), Wright (2010), and Wright (2009).



Seven Important Tips to Well Fitting Footwear on Your

Resident

1. Ensure they don't wear footwear that crowds their toes such as pointed toe shoes (see image below).



2. Make certain that the heel of their foot fits snugly into the heel of their shoe. In a shoe that is too loose, the heel of the resident's foot will come out of the shoe or rub/slide against the shoe when making strides/steps.
3. Ensure that the toe box (area that the toes occupy in a shoe) is wide and deep enough to accommodate their toes. You should feel a 0.5-inch space between their longest toe and the tip of the shoe.
4. Make sure they never wear shoes that have a rise of more than 2-2 ¼ inches high toward the heel. This puts too much pressure on the metatarsal area of their foot and increases risks of injury and foot deformity.

5. Educate the resident and their family about having the resident's feet measured in a standing position when buying a new pair of shoes. It's not uncommon to have one foot larger than the other. If one foot is larger, then suggest they fit their shoes to the larger foot.

6. Encourage shoe purchase in the afternoon when their feet are most edematous or swollen. This ensures they fit and do not pinch or become too tight by the afternoon.

7. Discuss with the resident and their family to avoid breaking in footwear. Recommend they buy shoes that are comfortable at the time of purchase.

Above footwear tips based on information from Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Medical Association (2013), Capital Health (2003), Harvard Health Publications (2009), Helfand (2009), Inlow (2003), Mitty (2009), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), Veterans Affairs Canada (2012), and Wright (2010).

More information can be found via Cleveland Clinic available from:

http://my.clevelandclinic.org/healthy_living/foot-ankle/hic-footwear-tips-for-evaluating-proper-fit.aspx

And/or Mayo Clinic available from: <http://www.mayoclinic.org/healthy-living/fitness/in-depth/walking/art-20043897>

What is a Corn?

A corn is a painful thickening of the epidermis found principally over toe joints and between the toes, often caused by friction or pressure. They may be hard, soft or seed types. Hard corns are usually found over the toe joints (bony prominences), soft usually between the toes. Seed corns tend to develop in the non-weight bearing areas of the foot and are commonly associated with dry skin. Corns tend to be cone shaped and this is why the center is typically hard than the outer surface.

What causes a corn?

- Corns, like calluses, primarily form due to friction and pressure on the foot.
- Associated with hereditary disorders.
- Wearing too tight shoes/footwear.
- Corn formation is increased when pressure is displaced and it is no longer balanced over the foot for example, a foot deformity.

What are the signs and symptoms of a corn?

- All corns appear round/cone like in shape.
- Hard corns look similar to calluses and are yellowish in color with a hard texture upon palpation.
- Soft corns found between the toes are in a moist environment, thus feel softer upon palpation, and are usually white/grey or yellow in color.

- Seed corns are often found on the sole of the foot and have a pinhole type appearance. They are usually smaller in size when compared to the hard and soft corn types.
- They are almost always painful. The amount of discomfort varies greatly from one individual to another.



Figure 3. Steps in Corn Formation.

More information can be found via Mayo Clinic available from:

<http://www.mayoclinic.org/diseases-conditions/corns-and-calluses/basics/definition/con-20014462>

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

- Check that the residents wear appropriately fitted footwear (shoes and socks).
- Surgical or orthotic correction of a present foot deformity may fix imbalances in pressure. Thus, decreasing corn risk.

Tips	To	Remember
<ul style="list-style-type: none"> • Ensure resident's shoes fit properly and accommodate for any deformities (e.g.) claw toe, bunions. • Encourage measuring resident's feet at each new shoe purchase. • Monitor for claw toe, mallet toe, hammer toe and other toe/foot deformities. 	<ul style="list-style-type: none"> • Moisturize resident's feet right after washing. Be sure to moisturize daily and never apply lotion between their toes. • Monitor residents for any red areas on their feet when removing footwear (this is a sign of a pressure area). 	<ul style="list-style-type: none"> • Ensure residents never go barefoot. • By wearing footwear at all times their feet are protected from friction and pressure; both of which cause corn formation. • Ensure residents wear their orthotics as prescribed (e.g.) toe separators, padding.

Corn section information based on Anderson, White & Kelechi (2010), Bennett (2006), Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Association of Canada (2013), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Harvard Health (2011), Lyman & Vlahovic (2010), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), Ricci (2011), Sibbald, Campbell, Coutts, & Queen (2003), Springett & White (2002), Turns (2013), Watkins (2012), Wright (2010), and Wright (2009).

To safely decrease a corn or callus on the older adult, use a diamond deb file or emery board to file (when appropriate).



Image above left: Diamond Deb file.

Image above right: Emery Board file.



What is Verruca Pedis?

Verruca Pedis or Plantar's Wart, are benign epidermal neoplasms that are caused by the human papillomavirus (HPV), which are small DNA viruses. They can be located on the sole or toes of the feet. They are often called plantar warts because they are most commonly found on the plantar surface of the foot.

What causes Plantar's Wart?

- Plantar warts are caused by HPV.
- They are spread person to person via warm, moist environments such as: gyms, showers, tubs, public pools, and via sharing unclean socks and footwear.

What are the signs and symptoms of plantar's wart?

- Individual may or may not report pain. Warts on bony prominences cause increased pain for the person..
- Impaired mobility i.e. decreased walking due to discomfort.
- Lack skin lines traversing throughout and have small black dots/pinpoints that are thrombosed capillaries (bleeding areas).
- There may be one or clusters of warts.



Did you know?

While some plantar warts will need treatment, others can resolve completely on their own without any intervention (Cleveland Clinic, 2014).

More information can be found via Cleveland Clinic available from:

http://my.clevelandclinic.org/disorders/warts/hic_plantar_warts.aspx

And/or Mayo Clinic available from: <http://www.mayoclinic.org/diseases-conditions/plantar-warts/basics/definition/con-20025706>

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

- Cleanse resident's feet daily with a mild soap, dry well paying extra attention to between the toes, and wear clean socks.
- By wearing clean socks and shoes and not sharing footwear items, you can decrease residents' chance of contracting warts on their feet.
- When using baths and showers shared by residents be sure to disinfect the tub/shower after each use to prevent spread of plantar warts (follow your infection control guidelines for same in your agency).

Tips	To	Remember
<ul style="list-style-type: none"> • Wash resident's feet daily and be sure to dry them well, especially between their toes. • Ensure they wear a clean pair of cotton/wool socks daily and change them if they become wet or sweaty as needed. • Always report a plantar wart to the RN. • Freezing treatments may be prescribed. 	<ul style="list-style-type: none"> • When using a shared shower/bath be sure to follow your infection control guidelines and disinfect the shower/tub surfaces after each use. • Never share shoes or socks between residents. Plantar warts are contagious and can spread from person to person via foot wear. 	<ul style="list-style-type: none"> • If there are cuts or scrapes on the skin of resident's feet, there is a higher risk of catching the virus that causes warts. • Use a new file for each resident to avoid transmission of warts. • To avoid spreading warts in the same individual, use a new file after filing a wart for use on other areas of the feet.

Verruca Pedis section information based on Anderson, White, & Kelechi (2010), Bennett (2006), Canadian Podiatry Association of Canada (2013), Digiovanni & Geisberg (2007), Lyman & Vlahovic (2010), National Diabetes Education Program (2012), Ricci (2011), Scher & Daniel (2005), Springett & White (2002), Turns (2013), and Wright (2010).

What is Tinea Pedis?

Tinea Pedis or Athlete's foot is a fungal infection of the foot that can present in several different ways and is often mistaken for other skin conditions, such as eczema or dermatitis. Fungi are naturally occurring on the skin but in some circumstances they multiply and cause an infection. It can occur between the toes and/or across the sole of the foot.

What causes Athlete's Foot?

- A fungal infection.
- Tight fitted shoes and shoes made of plastic are predisposing risks to contracting Athlete's foot.
- Wearing wet, moist, and/or sweaty socks and footwear can increase risk of infection. Fungus thrives in dark, wet, humid, and warm conditions.

What are the signs and symptoms of Athlete's foot?

- Usually occurs between and under the toes.
- Skin becomes reddened.
- Itching, burning, and/or stinging sensations may be present.
- An odor is a common complaint.
- Scaly, flaky and/or peeling skin on the foot.
- Wet, soggy (macerated) areas between the toes.
- Small spots or bubbles containing clear fluid may be present on the foot.



More information can be found via Mayo Clinic available from:

<http://www.mayoclinic.org/diseases-conditions/athletes-foot/basics/definition/con-20014892>

And/or Cleveland Clinic available from:

http://my.clevelandclinic.org/disorders/ringworm/hic_athletes_foot_jock_itch_and_ringworm.aspx

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

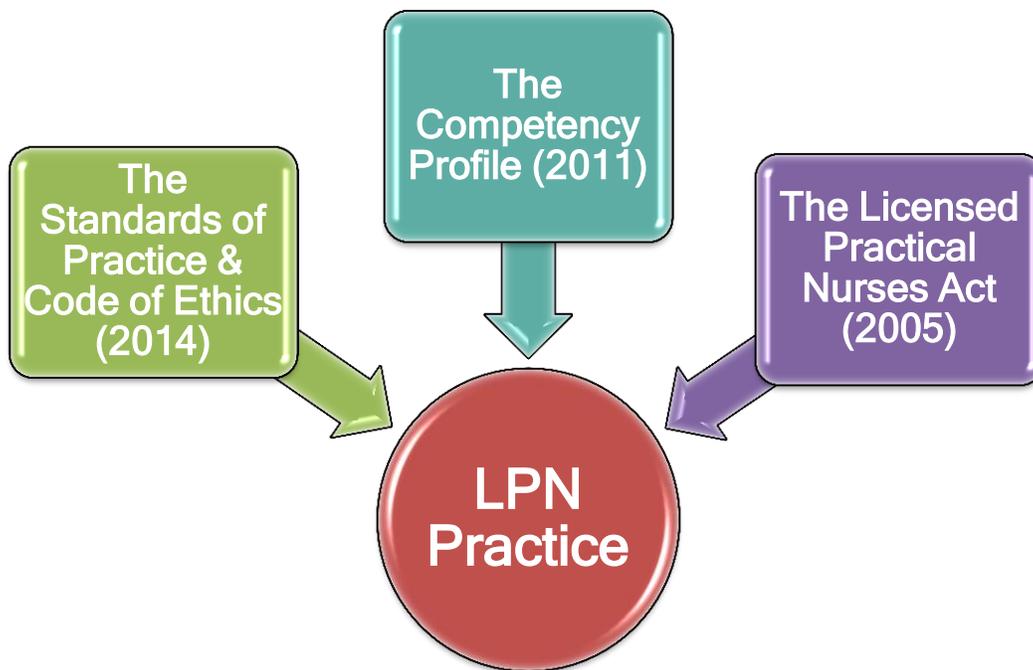
- Check that residents are wearing shoes and socks that are a breathable, natural material can decrease risk of fungal infection. Materials such as cotton and wool breathe well. Educate the resident and their family regarding recommended footwear.
- Keep resident's feet washed and dried well daily, or more often as needed. This can decrease risk of fungal infection. This is especially true in warm climates and during activities that make the feet sweat (e.g. walking).
- Fungus is contagious and requires medication. Prescribed anti-fungal medications along with regular hygiene work well to cure this condition.

Tips	To	Remember
<ul style="list-style-type: none"> • Wash resident's feet daily. Dry well between the toes. • Ensure a clean pair of cotton/wool socks are worn daily. • Change socks if they become wet or sweaty. 	<ul style="list-style-type: none"> • Fungal infections of the skin often require prescribed medications to resolve it. • Encourage that residents wear natural, breathable materials for socks and shoes. This will help prevent fungal infections. 	<ul style="list-style-type: none"> • Do not share personal items between residents to prevent spread of fungus (e.g.) socks, towels, and shoes. • Always follow your institution's policies and procedures and infection control guidelines.

Tinea Pedis section information based on Anderson, White, & Kelechi (2010), Bennett (2006), Canadian Podiatry Association of Canada (2013), Digiovanni & Geisberg (2007), Lyman & Vlahovic (2010), National Diabetes Education Program (2012), Ricci (2011), Scher & Daniel (2005), Springett & White (2002), Turns (2013), and Wright (2010).

When to Report

The Council for Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) supports and encourages Licensed Practical Nurses (LPNs) to practice within their professional scope of practice, clinical parameters defined by their employers through policies and procedures and their own individual competencies. They are expected to practice within the following documents:



Licensed Practical Nurses are accountable to recognize situations where the needs of the client are beyond their individual scope of practice or competency. Therefore, they are to consult with the appropriate health care provider to ensure the client receives safe, competent, and ethical care (LPN Act 2005). It is important that LPNs and employers recognize that the client needs and practice context (the setting in which practice takes place) determine the right nurse to engage in providing foot care (CLPNNL, 2014).

Documentation

Documentation is an integral part of nursing practice. It provides an accurate account of the professional services provided to clients when completed in adherence with the LPN Act and Regulations, policies and procedures of the employing agency, and professional accountability as outlined in the CLPNNL Standards of Practice (2014). A LPN documents only the care he/she provides except in situations where there is a dedicated recorder (CLPNNL).

A LPN maintains documentation that is:

- Clear, concise, and comprehensive
- Accurate and truthful
- Entered in a timely manner
- Client focused and confidential

(Reference: CLPNNL, 2014).

What should be documented?

9. *Assessment.* This includes subjective data (statements or feedback from the resident e.g. resident states, “I have pain in my toe”) and objective data (information that is observed e.g. a reddened toe).
10. *Planning.* Identification of priorities in the resident’s care. Did you notify the RN of an assessment finding such as edema or a wound? What actions will be taken next?
11. *Implementation.* What was done? (e.g. interventions and/or teaching).
12. *Evaluation.* What were the outcomes? What was the resident’s response? Did the intervention work or does it need to be reviewed/revise for the resident’s plan of care? What follow up is needed?

(References: Association of Registered Nurses of Newfoundland and Labrador, 2010; Barry, 2014; CLPNNL, 2014).

Always follow your agency's policies and/or guidelines on documentation of foot care practices.

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Toenail Pathologies of the Older Adult

Introduction

This module will identify the **five** common toenail pathologies with the related signs and symptoms, and contributing factors observed in the older adult. Relevant prevention strategies and nursing interventions will be described including the importance of reporting to the most appropriate health care provider.

Learning Objectives

By the end of this module you will be able to discuss:

- (a) signs and symptoms
- (b) risks
- (c) preventative practices in the older adult for:



What is Onychauxis?

Onychauxis or thickened nail develops in the older adult due to the aging process, infections, and/or disease processes. Examples include fungal infections and/or skin diseases like psoriasis.

What causes thickened nail?

- The aging process.
- Hereditary.
- Nail trauma (e.g. dropping an object on the toenail).
- Psoriasis.

What are the signs and symptoms of thickened nail?

- Thick, hard, yellow toenails.
- On one or more toenails for some individuals.
- Redness may develop to surrounding nail skin from pressure.

Nursing Interventions

- Keep resident's feet protected from trauma by wearing appropriate footwear when possible (e.g. no open toe shoes).
- If a resident is diagnosed with a skin condition like psoriasis, then the treatment may reverse the nail thickening.

Figure 1 below, contains priority nursing interventions in providing resident foot care for those with thickened toenails.

Tips To Remember

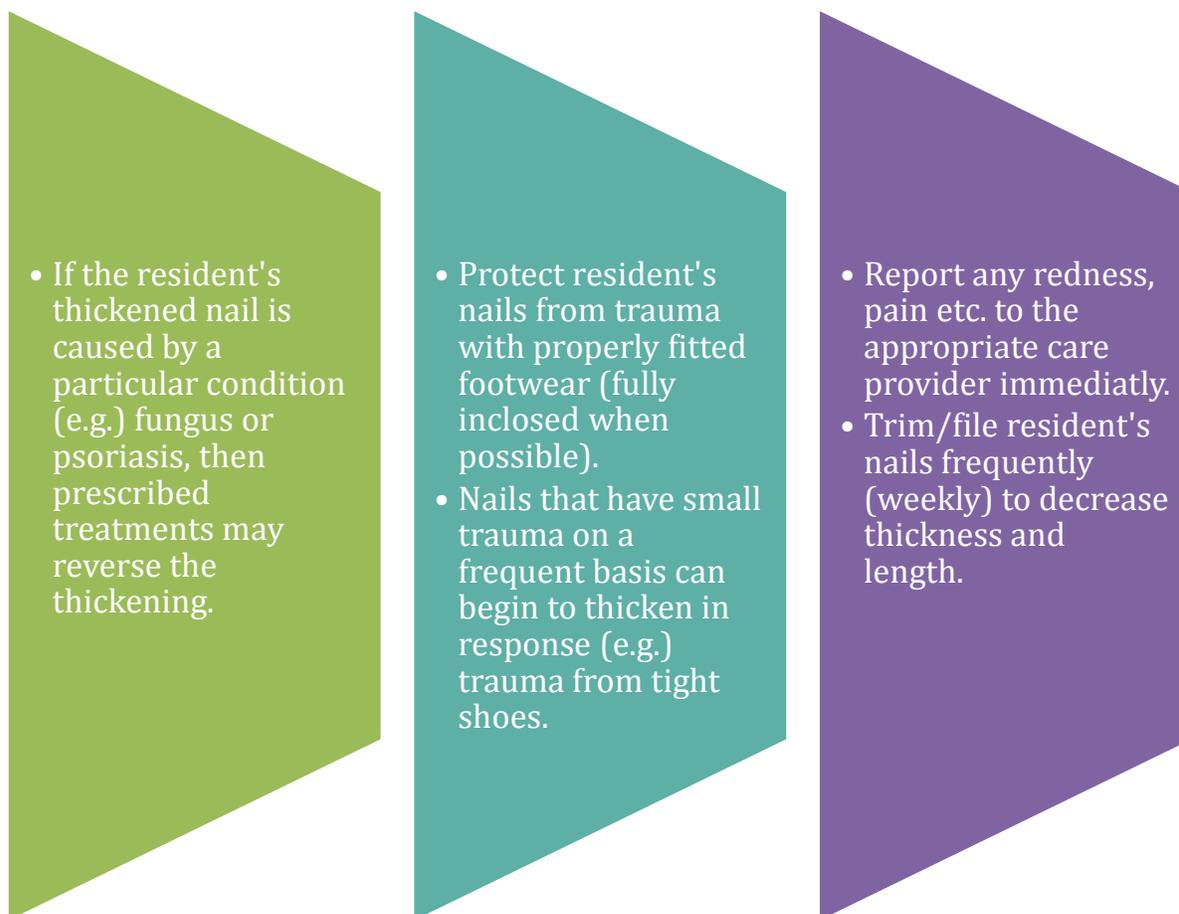


Figure 1. Tips To Remember for individuals with thickened toenails.

Onychia section based on information from Bentley (2008), Coughlin, Saltzman, & Anderson (2013), Registered Nurses Association of Ontario (2004), Scher & Daniel (2005), and Turns (2013).

Step-by-step instructions on properly cutting thickened toenails is available on

What is Onychocryptosis?

the Mayo Clinic website: <http://www.mayoclinic.org/nails/sls-20076741>

Onychocryptosis or ingrown nails happen when the nail itself grows into the surrounding tissue and breaks through the skin. This can be serious for 'high risk'

individuals. Ingrown toenails tend to be hereditary. However, other causes include tight shoes, pointed toe shoes, compression stockings, and/or improper nail trimming to the feet.



Above image of ingrown toenail from: www.mayoclinic.com

What causes an ingrown nail?

- Cutting the nails into the corners (improper nail cutting).
- Poor eyesight leading to improper cutting of the nails.
- Tight shoes.
- Pointed toe shoes.
- High-heeled shoes (Shoes higher than 5 - 5.7cm (2 - 2 1/4 inches).
- Abnormal curvature of the toenail (see the following section on involuted toenail for more information on causes of abnormal curvature).

What are the signs and symptoms of an ingrown nail?

- Broken skin at the nails edge.
- Bleeding at the nails edge.

- Purulent drainage from the nail.
- Nail fragment is visibly piercing the skin.
- Redness, reports of soreness, pain, and/or swelling of the skin surrounding the nail.

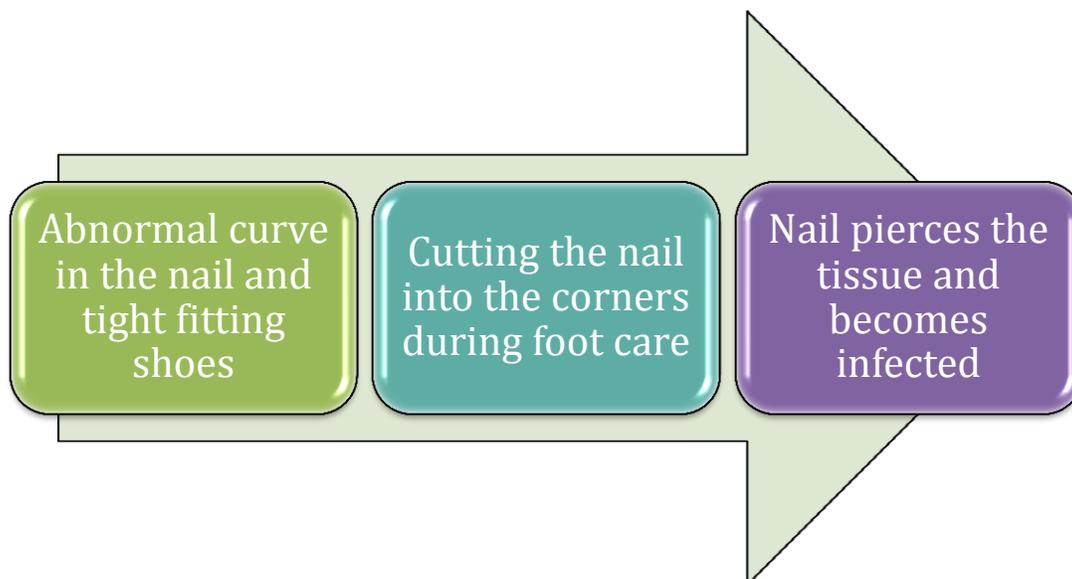
Nursing Interventions

- Cut the resident's nails straight across and do not cut them shorter than the **tip of their toe**.
- Ensure residents wear shoes that have a **wide toe box** (*the toe box is the frontal portion of a shoe or boot where the toes and front of the foot lay*).
- Assist residents who have poor eyesight, mobility, flexibility, and other risk factors. Do not have these individuals attempt to trim their own nails as improper cutting may occur and result in toenail and foot complications.
- Ensure that resident's footwear doesn't elevate more than 5 - 5.7cm (2 - 2 1/4 inches) at the heel (where possible). This places unnecessary strain on the fore foot and pushes the toes tightly against the shoe increasing risk of an ingrown nail.

PROGRESSION OF EVENTS WITH IMPROPER FOOT CARE

When a resident or older adult develops an abnormal curvature in their toenail(s) it puts them at high risk for ingrown nails. If a nurse were to cut this type of toenail improperly (into the corners) then this would cause the

toenail to pierce into the tissue surrounding the toenail, putting the older adult at risk of infection.



Additional Resource.

See Mayo Clinic website: <http://www.mayoclinic.org/diseases-conditions/ingrown-toenails/basics/definition/con-20019655>

Figure 2 below, contains priority nursing interventions in providing resident foot care for those with ingrown toenails.

Tips To Remember

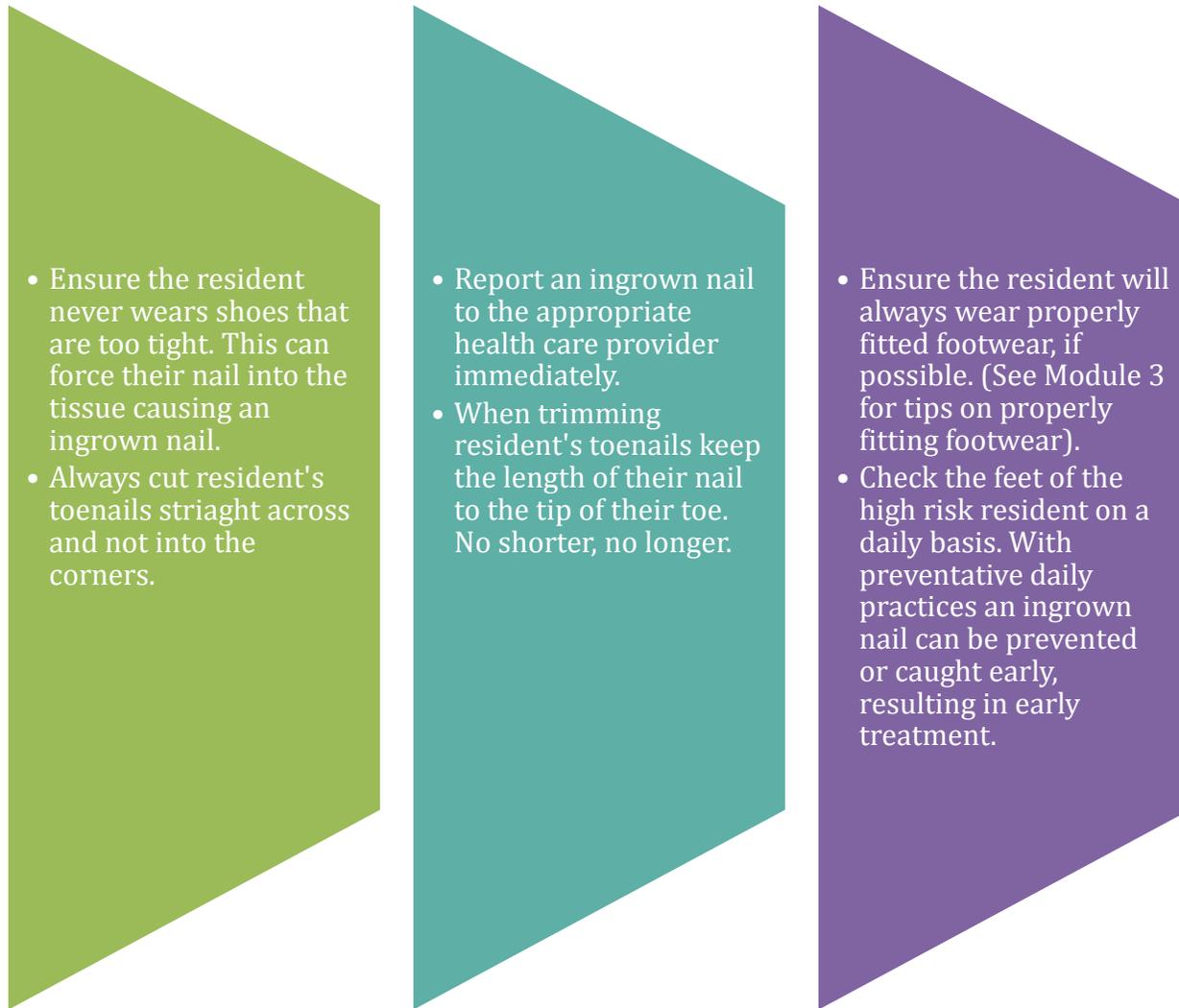


Figure 2. Tips To Remember for individuals with ingrown toenail(s).

Did you know?

If an ingrown toenail is untreated or undetected, it can lead to osteomyelitis (infection of bone)! This is just one possible complication in the high-risk older adult (Mayo Clinic, 2014).



Image above left: a wide toe box.

Image above right: a narrow toe box.

Onychocryptosis section based on information from Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Medical Association (2013), Coughlin, Saltzman, & Anderson (2013), Lyman & Vlahovic (2010), Mayo Clinic (2014), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), and Scher & Daniel (2005).

What is an Involuted Nail?⁴⁴

An involuted nail has a very pronounced curve (in varying degrees) so the edge of the nail often grows into the surrounding tissue of the toe and breaks through the skin.

What causes an involuted toenail?

- Hereditary.
- Wearing footwear that is too tight (e.g. shoes, boots, and/or slippers).
- Toenail injury (e.g. trauma).
- An abnormal curve in the margins of the toenail plate (may be on one or both sides of the toenail).

What are the signs and symptoms of an involuted nail?

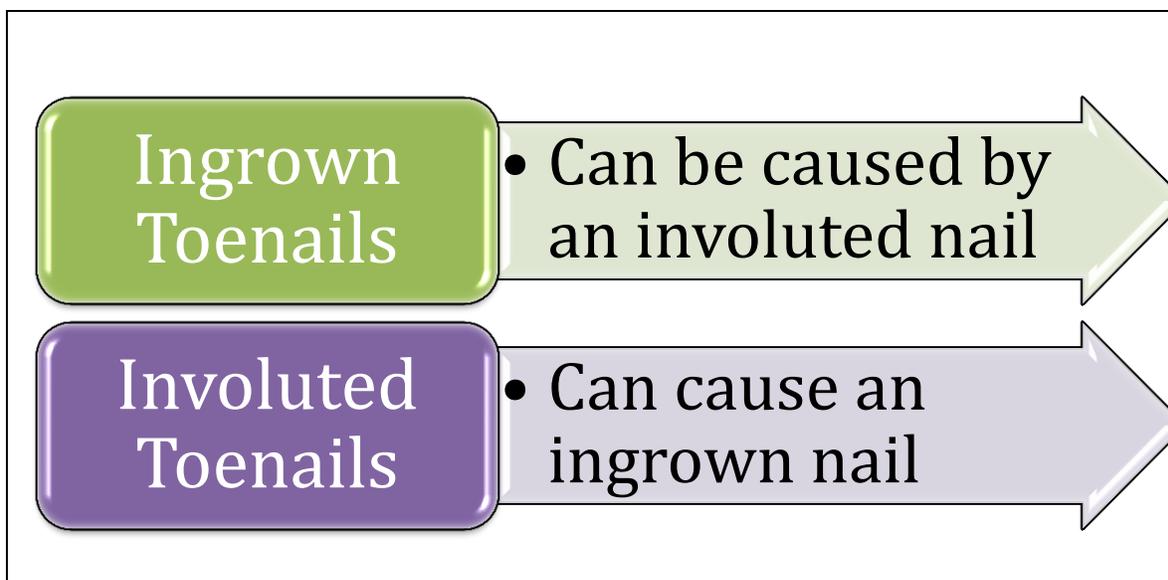
- Reporting of pain and discomfort in the toe.
- The nail is unusually curved.
- The nail may or may not be broken through the tissue of the toe.
- Inflammation, redness, edema, and/or bleeding/purulent drainage may be present if infection occurs.

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

- Ensure residents wear shoes that have a wide toe box and never wear shoes that are too tight or that have a pointed/narrow toe box, which adds pressure and increases pain (where possible).
- Protect resident's feet from injury by ensuring they are wearing appropriate footwear (e.g. no open toe shoes) where possible.
- If the involution is severe, a physician may permanently remove the margin of the toenail that is becoming imbedded.

Keep in Mind that...



Note. Information taken from various sources (see Bibliography).

Figure 3 below, contains priority nursing interventions in providing resident foot care for those with involuted toenails.

Tips To Remember

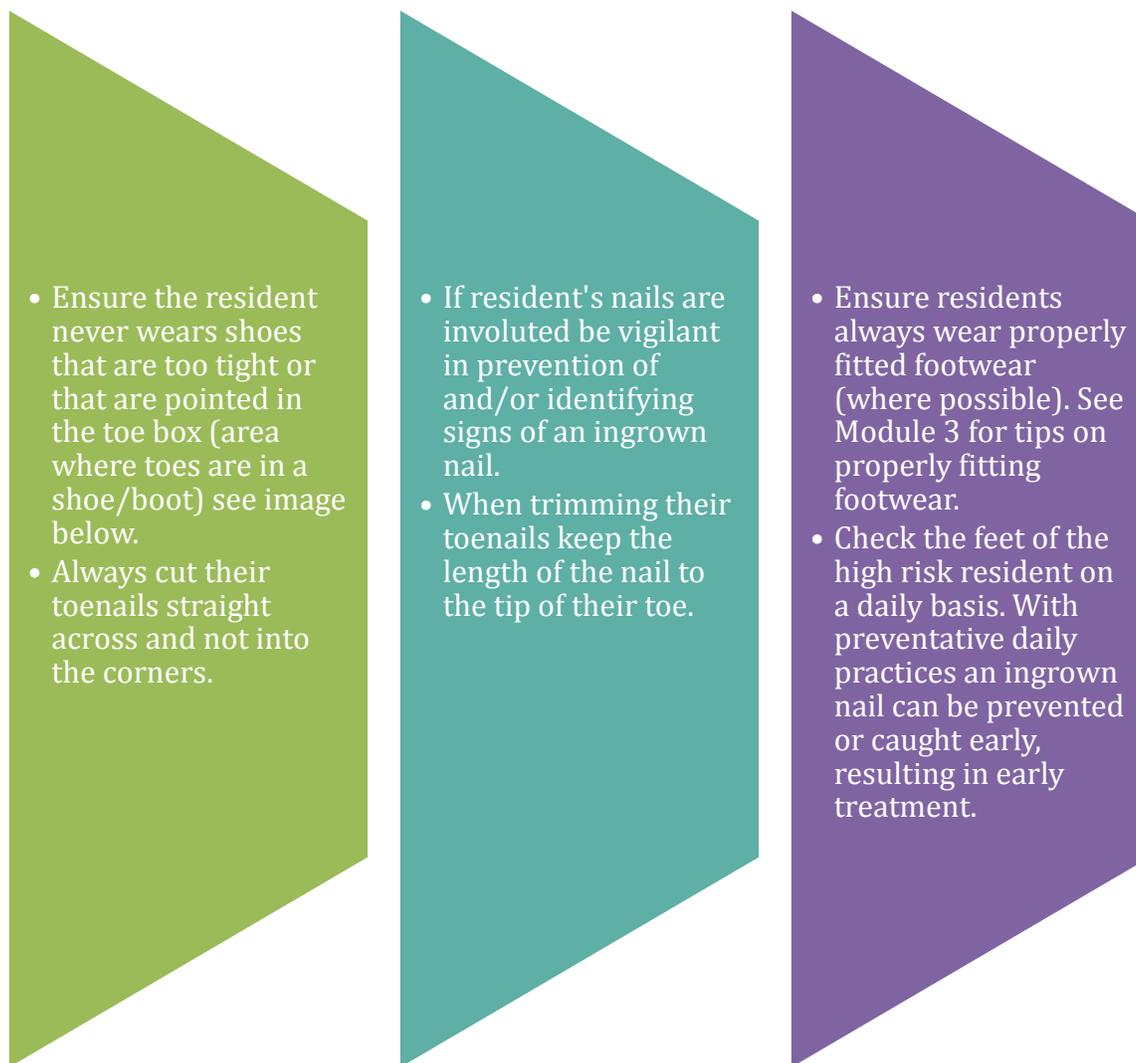


Figure 3. Tips To Remember for individuals with involuted toenail(s).

Involuted toenail section based on information from Bradford District Care Trust (2012), Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Canadian Podiatry Medical Association (2013), Coughlin, Saltzman, & Anderson (2013), Lyman & Vlahovic (2010), Mayo Clinic (2014), National Diabetes Education Program (2012), Registered Nurses Association of Ontario (2004), and Scher & Daniel (2005)..

What is Onychogryphosis?

Onychogryphosis or Ram's Horn nail has several characteristics such as, a curved, long length and a hard, thick texture. It is commonly associated with poor circulation of the lower limbs and/or toenail trauma. A Ram's Horn will rarely revert to normal. This condition may develop in one or more toenails.

What causes Ram's Horn nails?

- Repeated minor trauma over many years from ill-fitting footwear can cause damage with resulting thickening and curving.
- Nail trauma that is significant and may be one time only (e.g. dropping a can of food on the foot. This can damage the nail root causing the nail to grow in a curved manor with thickening).
- Peripheral vascular disorders (e.g.) peripheral vascular disease.
- Sometimes caused by neglect (e.g.) not cutting or caring for the nails for many years.
- More common with advanced age.

What are the signs and symptoms of Ram's Horn nails?

- Thickened nail.
- Horn-like appearance.
- Long and/or curling shape.

- Reports of pain in toes from the pressure of the thickened nails on the surrounding nerves, skin, and tissues.

Nursing Interventions

- Ensure the resident wears protective, well-fitting footwear to keep their toenails from becoming injured.
- Care for the nails on a regular basis (e.g. weekly cleansing, trimming, and/or filing).



Figure 4 below, contains priority nursing interventions in providing resident foot care for those with Ram's Horn toenails.

Tips To Remember

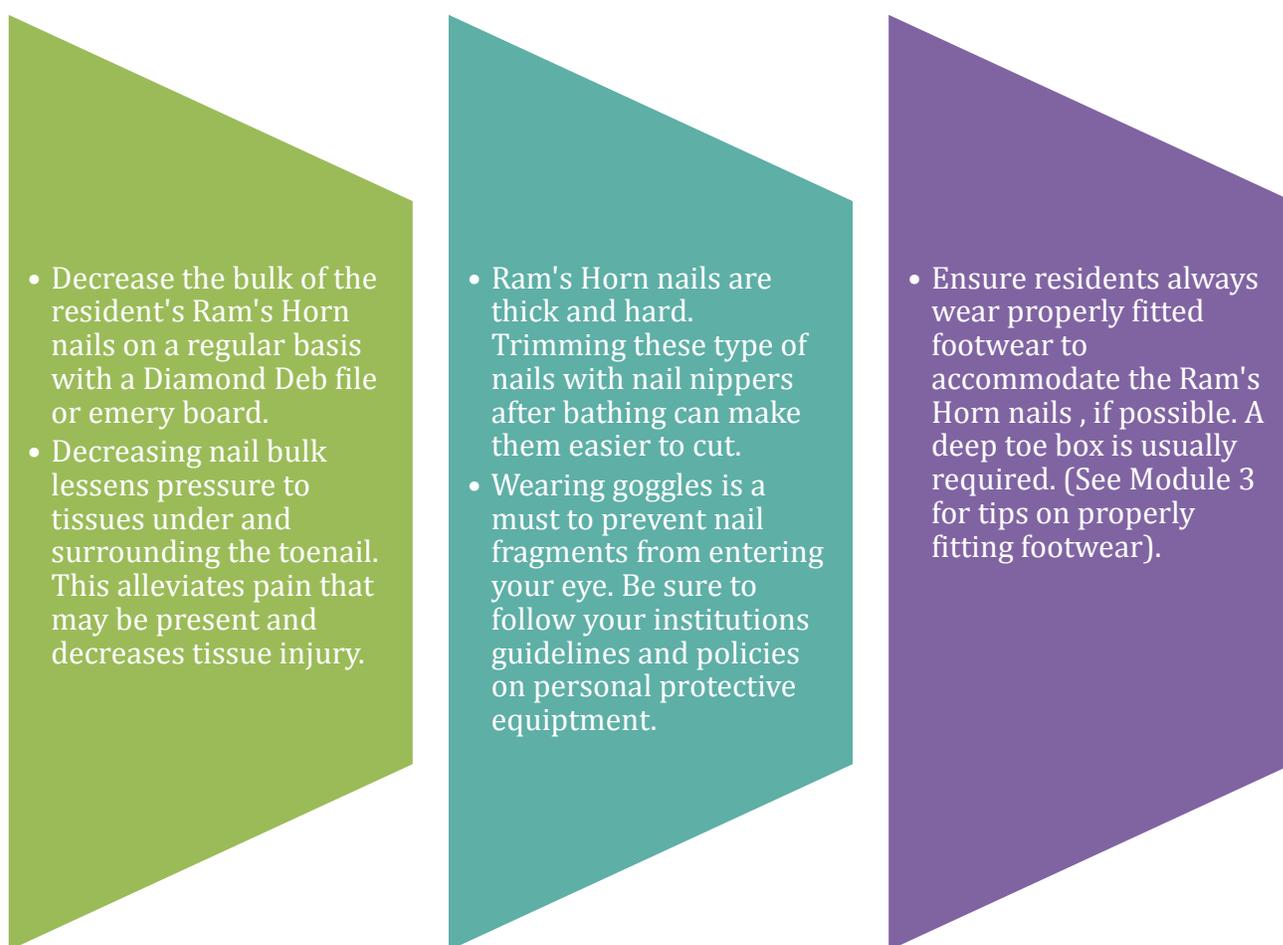


Figure 4. Tips To Remember for individuals with Ram's Horn Toenail(s).

Onychogryphosis section based on information from Coughlin, Saltzman, & Anderson (2013), Digiovanni & Geisberg (2007), James, Berger, & Elston (2011), and Scher & Daniel (2005).

Additional information is available in the Merck Manual website:

http://www.merckmanuals.com/professional/dermatologic_disorders/nail_disorders/nail_deformities_and_dystrophies.html

What is Onychomycosis?

[rs/nail_deformities_and_dystrophies.html](http://www.merckmanuals.com/professional/dermatologic_disorders/nail_disorders/nail_deformities_and_dystrophies.html)

Onychomycosis or fungal nails commonly affect the toenails. This condition is usually only found in adults. It is caused by a dermatophyte (fungus) that infects keratinized tissues, some yeasts, and molds.

What causes fungal nails?

- A fungus called a dermatophyte. (Additional information and images of dermatophytes on the Center for Disease Control and Prevention website: <http://www.cdc.gov/fungal/diseases/dermatophytes/>).
- Heavy perspiration and humid environments increase risks of nail fungus.
- This decreases ventilation and increases moisture. Fungus will thrive and grow in dark and moist environments.
- Tight footwear that crowds the toes or is made of non-breathable materials (e.g.) decreases ventilation and increases moisture/heat that fungus thrives in.
- Weakened immune system (e.g.) individuals taking chemotherapy drugs.

What are the signs and symptoms of fungal nails?

- Dry, brittle, thick toenails.

- Brown-yellow debris and white/yellow discoloration of the toenail.

Nursing Interventions

- Ensure the resident wears shoes and socks that are a breathable, natural material such as cotton or wool. This can decrease risk of fungal infection.
- Wash and dry resident's feet well daily, or more often as needed. This can decrease risk of fungal infection. This is especially true in warm climates and during activities that make the feet sweat (e.g. exercising).
- Make sure that the resident wears shoes and socks that fit well and do not overcrowd the toes.
- Protect the resident's feet from becoming infected with fungus by making sure they have appropriate footwear on, especially in high risk areas such as shared showers/baths.

PROGRESSION OF EVENTS WITH IMPROPER FOOT CARE

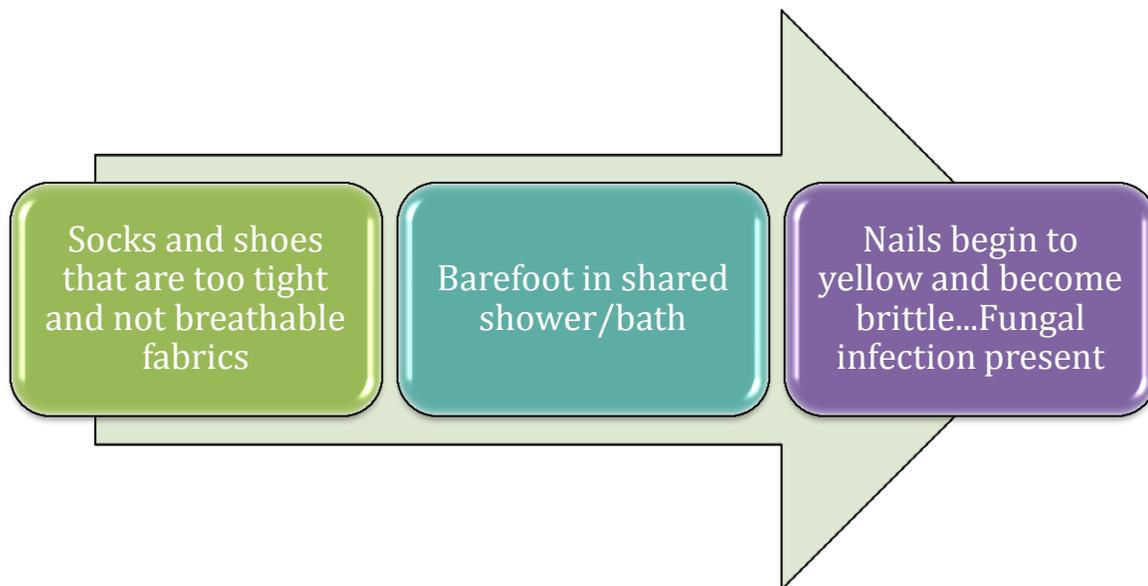


Figure 5 below, contains priority nursing interventions in providing resident foot care for those with fungal toenails.

Tips To Remember



Figure 5. Tips To Remember for individuals with fungal toenail(s).

Onychomycosis section based on information from Anderson, White, & Kelechi (2010), Canadian Association of Wound Care (2013), Canadian Diabetes Association (2013), Coughlin, Saltzman, & Anderson (2013), Digiovanni & Geisberg (2007), Lyman & Vlahovic (2010), Registered Nurses Association of Ontario (2004), Ricci (2011), Scher & Daniel (2005), and Wright (2009).

Additional information is available from the Mayo Clinic website:

<http://www.mayoclinic.org/diseases-conditions/nail-fungus/basics/definition/con-20019319>

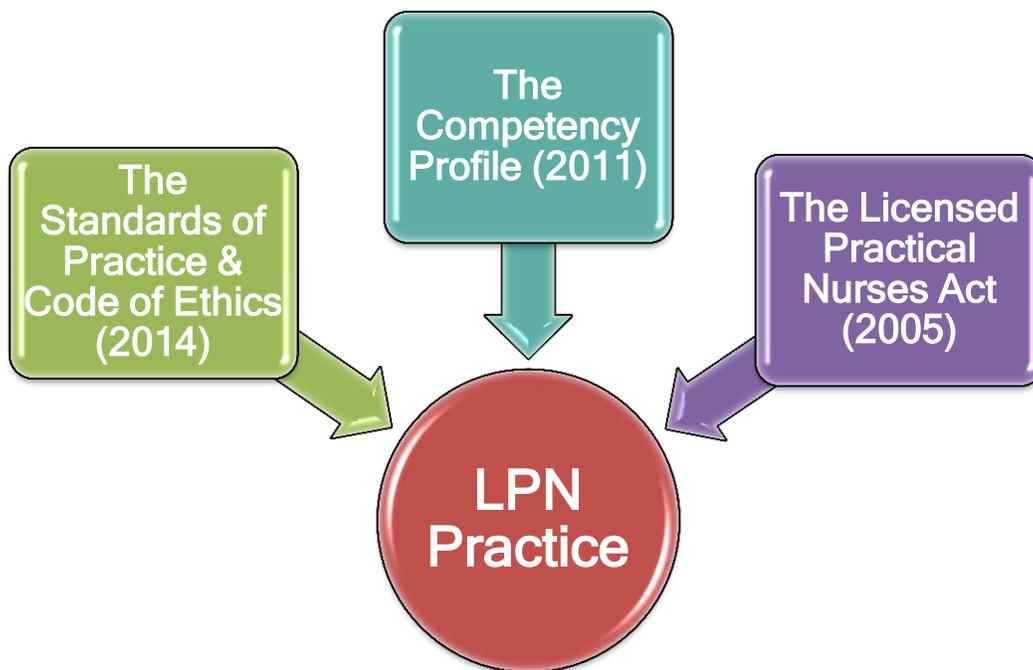
And/or Cleveland Clinic available from:

<http://my.clevelandclinic.org/orthopaedics-rheumatology/diseases-conditions/mycotic-nails.aspx>



When to Report

The Council for Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) supports and encourages Licensed Practical Nurses (LPNs) to practice within their professional scope of practice, clinical parameters defined by their employers through policies and procedures and their own individual competencies. They are expected to practice within the following documents:



Licensed Practical Nurses are accountable to recognize situations where the needs of the client are beyond their individual scope of practice or competency. Therefore, they are to consult with the appropriate health care provider to ensure the client receives safe, competent, and ethical care (LPN Act 2005). It is important that LPNs and employers recognize that the client needs and practice **Documentation** context determine the right nurse to engage in providing foot care.

Documentation is an integral part of nursing practice. It provides an accurate account of the professional services provided to clients when completed in adherence with the LPN Act and Regulations, policies and procedures of the employing agency, and professional accountability as outlined in the CLPNNL Standards of Practice (2014). A LPN documents only the care he/she provides except in situations where there is a dedicated recorder (CLPNNL).

A LPN maintains documentation that is:

- Clear, concise, and comprehensive
- Accurate and truthful
- Entered in a timely manner
- Client focused and confidential

(Reference: CLPNNL, 2014).

What should be documented?

13. *Assessment.* This includes subjective data (statements or feedback from the resident e.g. resident states, “I have pain in my toe”) and objective data (information that is observed e.g. a reddened toe).

14. *Planning.* Identification of priorities in the resident’s care. Did you notify the RN of an assessment finding such as edema or a wound? What actions will be taken next?

15. *Implementation.* What was done? (e.g. interventions and/or teaching).

16. *Evaluation.* What were the outcomes? What was the resident’s response? Did the intervention work or does it need to be reviewed/revise for the resident’s plan of care? What follow up is needed?

(References: Association of Registered Nurses of Newfoundland and Labrador, 2010; Barry, 2014; CLPNNL, 2014).

Always follow your agency’s policies and/or guidelines on documentation of foot care practices.

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Joint Pathologies of the Older Adult

Introduction

This module will identify the **seven** common joint pathologies with the related signs and symptoms, and contributing factors observed in the older adult.

Relevant prevention strategies and nursing interventions will be described including the importance of reporting to the most appropriate health care provider.

Learning Objectives:

By the end of this module you will be able to discuss:

- (a) signs and symptoms
- (b) risks
- (c) preventative practices for:



What is Hallux Valgus?

Hallux Valgus or bunions are the most common pressure related *bursitis* (*painful inflammation of the fluid filled pads that cushion the joints*). They form over the base of the great toe from resulting friction and distortion of the first metatarsophalangeal joint (MTP). This can occur from wearing shoes that are too tight, too pointed or narrow in the toe box (e.g. pointed toe shoes or boots).

What causes a bunion?

- Heredity.
- Wearing narrow, pointed toe, and/or high heel shoes (heel over 5.7cm or 2 ¼ inches) that put pressure on the foot and push the great toe out of its natural placement.
- Obesity. This places an increased pressure/weight on the foot.
- Certain types of arthritis, such as rheumatoid arthritis, can contribute to bunions.

What are the signs and symptoms of a bunion?

- Reddened area over the affected joint.
- Some individuals develop a callus over the joint.
- Reports of pain or discomfort in the MTP joint.
- The great toe tilting/bending toward the other digits.



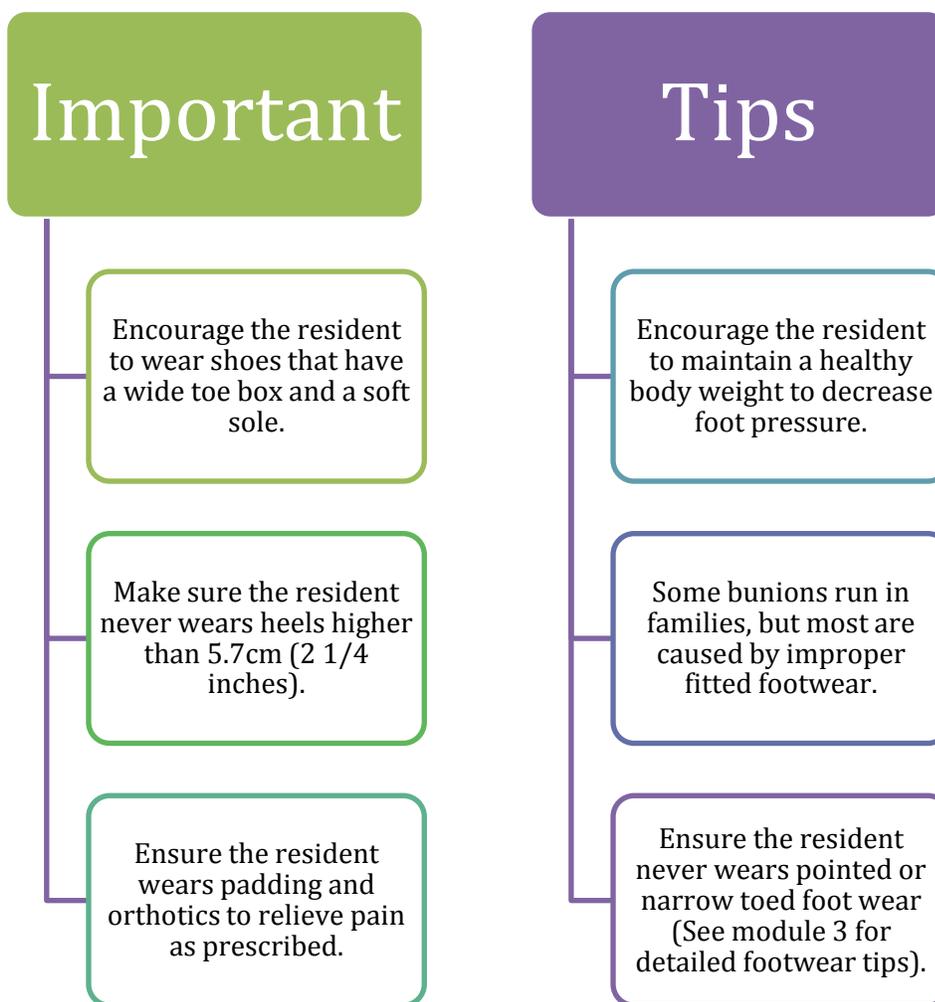
Above image of bunion from: www.mayoclinic.com

Nursing Interventions

- Ensure the resident wears shoes that have room in the toe box (area of the shoe where the toes lay) to avoid crowding of toes.
- Encourage the resident to eat healthy foods and exercise (when possible/appropriate) to maintain a normal body weight.
- Make sure the resident takes their medications and treatments for arthritis as prescribed by the physician.

Additional information can be found on the American Academy of Orthopaedic Surgeons website:

<http://orthoinfo.aaos.org/topic.cfm?topic=a00155>



Did you know?

Nine out of ten bunions happen to women and nine out of ten women wear shoes that are too small (American Academy of Orthopaedic Surgeons, 2012).

Hallux Valgus section based on information from American Academy of Orthopedic Surgeons (2012), Bennett (2006), Canadian Podiatry Medical Association (2013), Canale & Beaty (2012), Caselli & George (2003), Coughlin, Saltzman, & Anderson (2013), Digiovanni & Geisberg (2007), Etnyre, Zarate-Abbott, Roehrick, & Farmer (2011), Frontera, Silver, & Rizzo Jr (2014), Lyman & Vlahovic (2010), Registered Nurses Association of Ontario (2004), and Wright (2009).

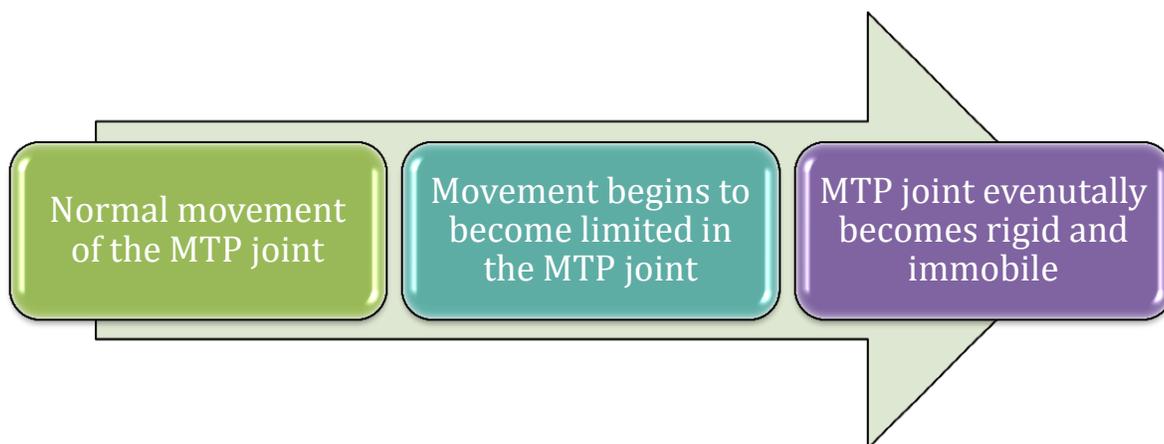
What is Hallux Rigidus?

Hallux Rigidus or frozen toe is a degenerative joint disease or loss of articular cartilage from the first MTP joint in the great toe. This condition can lead to painful restriction of motion. The limited range of motion and pain with hallux rigidus are exacerbated by overgrowth of bone (osteophytes or “bone spurs”). Hallux rigidus is the second most common problem in the first MTP joint, after hallux valgus.

What causes frozen toe?

- Bone spur formation.
- Arthritis.
- Overuse of the joint.
- Stubbing or spraining the joint may cause it to “freeze”.

FROZEN TOE IS DIFFICULT TO PREVENT AND OFTEN PROGRESSES...



Note. Information taken from various sources (see Bibliography).

What are the signs and symptoms of frozen toe?

- Inflammation and/or swelling of the toe.
- Reports of pain that is constant or intermittent that occurs with walking and is relieved with rest.
- Reports of stiffness in the affected toe.
- Occasionally the toe can 'lock' because of the spur formation (spurs are outgrowths/projections of the bone that form along the edges of bones).

Nursing Interventions

- Exercise the resident's toe to decrease stiffness. This can be accomplished by doing range of motion activities (this will slow the progression of frozen toe).
- Ensure that the resident wears shoes that have a wide toe box that give the toes room to move. Discuss this with the resident and their family.



Note. Information taken from various sources (see Bibliography).

Important

Administer anti-inflammatory medications as prescribed for swelling and/or discomfort if appropriate.

Ensure the resident never wear heels higher than 5.7cm (2 1/4 inches) and use footwear that provides space for the toes (wide toe box).

Tips

Frozen toe often cannot be prevented but it's progression can be slowed by doing range of motion exercises daily.

Discuss with the resident and/or their family about avoiding overuse of the joint and repetitious movements.

Additional information can be found on the American Orthopaedic Foot & Ankle

Society website: <http://www.aofas.org/footcaremd/conditions/ailments-of-the-big-toe/Pages/hallux-rigidus.aspx>

And/or the Cleveland Clinic website:

<http://my.clevelandclinic.org/disorders/hallux-rigidus/hic-hallux-rigidus-stiff-big-toe.aspx>

Hallux Rigidus section based on information from American Academy of Orthopedic Surgeons (2012), Canale & Beaty (2012), Frontera et al. (2014), and Shurnas (2009).

What is Claw Toe?

Claw toe is defined as hyperextension of the MTP joint and flexion of the proximal interphalangeal joint (PIP) with or without flexion of the distal interphalangeal joint (DIP). This hyperextension at the MTP joint specifically differentiates this condition from hammer toe and mallet toe. The deformity may affect any toe and often there is involvement of all toes. Claw toe can be either a flexible deformity, in which the toe can be moved, or a fixed deformity, in which there is contracture and impaired mobility.

What causes a claw toe?

- Congenital deformity.
- Arthritis.
- Wearing footwear that is too tight.
- Imbalances in foot muscles.

What are the signs and symptoms of claw toe?

- Reports of pain and/or discomfort in the affected toe.
- Callusing of the tip of the affected toe and/or PIP joint from pressure and friction.
- Reports of discomfort wearing shoes.

Nursing Interventions

- Provide medications for arthritis to the resident as per physician's orders.
- Monitor that the resident wears footwear that allows room for their toes to move freely without crowding.
- Exercise their feet and toes with gentle activities to help prevent imbalances in muscular strength (e.g.) picking up marbles with the toes.
- Shoes can have pockets stretched into them to accommodate a claw toe.

More information can be found on the Cleveland Clinic website:

<http://my.clevelandclinic.org/orthopaedics-rheumatology/diseases-conditions/clawtoes.aspx>

And/or the American Academy of Orthopaedic Surgeons website:

<http://orthoinfo.aaos.org/topic.cfm?topic=A00156>

Claw Toe section based on information from American Academy of Orthopedic Surgeons (2012), Canale & Beaty (2012), Caselli & George (2003), and Etnyre et al. (2011).

What is Hammer Toe? 176

Hammer toe refers to an abnormal flexion posture at the PIP joint of one or more of the four toes. A hammer toe involves hyperextension of the MTP joint, flexion of the PIP joint, and extension of the DIP joint. In contrast to clawing, which tends to involve all toes, hammer toe deformity, flexible or rigid, usually affects only one or two toes with the second toe being the most common.

What causes a hammer toe?

- Heredity.
- Wearing shoes that are too small and/or tight.
- Inflammation of the joints caused by arthritis.
- Imbalances in the muscles of the foot.

What are the signs and symptoms of hammer toe?

- Reports of pain, redness, swelling, and/or tenderness at the PIP joint.
- Callus formation at the PIP joint from shoe friction is common.
- A bent appearing toe shape.

Note. Information taken from various sources (see Bibliography).

Nursing Interventions

- Treat resident's arthritis per doctor's orders.
- Ensure the resident wears footwear that allows room and doesn't crowd the toes. Discuss this with the resident and their family.
- Ensure the resident wears shoes that accommodate the toe deformity.
- Assist the resident to exercise their feet and toes with gentle activities to help prevent imbalances in muscular strength (e.g.) picking up marbles with the toes.

Additional information can be found on the American Academy of Orthopaedic

Surgeons website: <http://orthoinfo.aaos.org/topic.cfm?topic=A00160>

And/or the British Columbia Podiatric Medical Association website:

<http://www.bcpodiatrists.ca/high-risk-feet#seniors>

Hammer Toe section based on information from American Academy of Orthopaedic Surgeons (2012), Bennett (2006), Canadian Podiatry Medical Association (2013), Canale & Beaty (2012), Caselli & George (2003), Etnyre et al. (2011), Frontera et al. (2014), Registered Nurses Association of Ontario (2004), and Wright (2009).

What is Mallet Toe?

Mallet toe refers to an abnormal flexion deformity at the distal DIP joint. Typically, there is normal alignment of the MIP and PIP joints. The second toe is the most commonly affected, although there may be involvement of multiple toes for example, the third and fourth toes. The deformity may be rigid or flexible, and the condition may occur in one or both feet.

What causes a mallet toe?

- High-heeled shoes and shoes with a narrow toe box (pointed toes) aggravate the deformity.
- Injury to the toe.
- Arthritis.
- Imbalances in the foot muscles.

What are the signs and symptoms of mallet toe?

- Reports of pain and/or tenderness of the DIP joint.
- Toenail deformities, in the affected toe, is common and may be due to pressure.

Nursing Interventions

- Ensure the resident does not wear shoes that are too tight and that crowd the toes.
- Make sure the resident does not wear high heel shoes (e.g. shoes above 5.7cm (2 ¼ inches) toward the heel of the shoe. *(See module 3 for more detailed information).*
- Ensure the resident wears shoes that accommodate the toe deformity.
- Exercise their feet and toes with gentle activities to help prevent imbalances in muscular strength (e.g.) picking up marbles with the toes.

Additional information can be found on the Canadian Podiatric Medical

Association website:

http://www.podiatrycanada.org/index.php?option=com_content&view=article&id=7&Itemid=5

And/or the Mayo Clinic website: <http://www.mayoclinic.org/diseases-conditions/hammertoe-and-mallet-toe/basics/definition/con-20019378>

Mallet Toe section based on information from Canale & Beaty (2012), Frontera et al. (2014), and Registered Nurses Association of Ontario (2004).

What is Pesplano Vulgus?

Pesplano Vulgus or flat foot occurs when the ligaments and tendons are weakened causing the height of the medial longitudinal arch to decrease or fall flat.



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Above left: Normal Arch.

Above right: Flat Arch.

Above image of flatfoot from: www.mayoclinic.org

What causes a flat foot?

- Heredity.
- Injury to the ligaments that causing them to become weak.
- Obesity.
- Postural abnormalities.

What are the signs and symptoms of a flat foot?

- Reports of pain and/or discomfort in the arch and/or calf with activity.
- Visibly flattened foot arch.

Nursing Interventions

- Maintain a normal body weight.
- Protect the foot from injury with footwear that covers the foot (no open toe shoes).
- Ensure the resident wear footwear that protects their feet from injury. (*See module 3 for more details on fitting footwear*).
- With your resident and their family, encourage eating well by following Canada's Food Guide to maintain a normal body weight.
- Some surgical procedures are available to correct this condition.

Additional information can be found on the British Columbia Podiatric Medical Association website: <http://www.bcpodiatrists.ca/foot-problems#flat-feet>

What is Pes Cavus?

Pesplano

section based on information from Canale & Beaty (2012), Caselli & George (2003), Cleveland Clinic (2014), and Mayo Clinic (2012).

Vulgus

Pes Cavus or high arch is a condition where the medial longitudinal arch is elevated more than normal. High arch is often unpreventable, but the below nursing interventions can be taken to help those with high arch.

What causes a high arch?

- Heredity.
- Muscular deformities or imbalances (e.g. spina bifida and/or cerebral palsy).

What are the signs and symptoms of high arch?

- Reports of pain and/or discomfort in the arch of the foot.
- Visibly heightened arch.

Nursing Interventions

- Shoe modifications and bracing are other options besides surgery to help residents with high arch.
- High arch can cause balance to be off. Be aware of this fall risk for residents.

- Prescribed orthotics are helpful to residents with high arch.
- Some surgical procedures are available to correct this condition.



Pes Cavus section based on information from American Academy of Orthopedic Surgeons (2012), Canale & Beaty (2012), Caselli & George (2003), Cleveland Clinic (2014), and Mayo Clinic (2012).

Additional information can be found on the Cleveland Clinic website:

http://my.clevelandclinic.org/healthy_living/foot-ankle/hic-footwear-tips-for-evaluating-proper-fit.aspx

Note.

taken from

sources (see

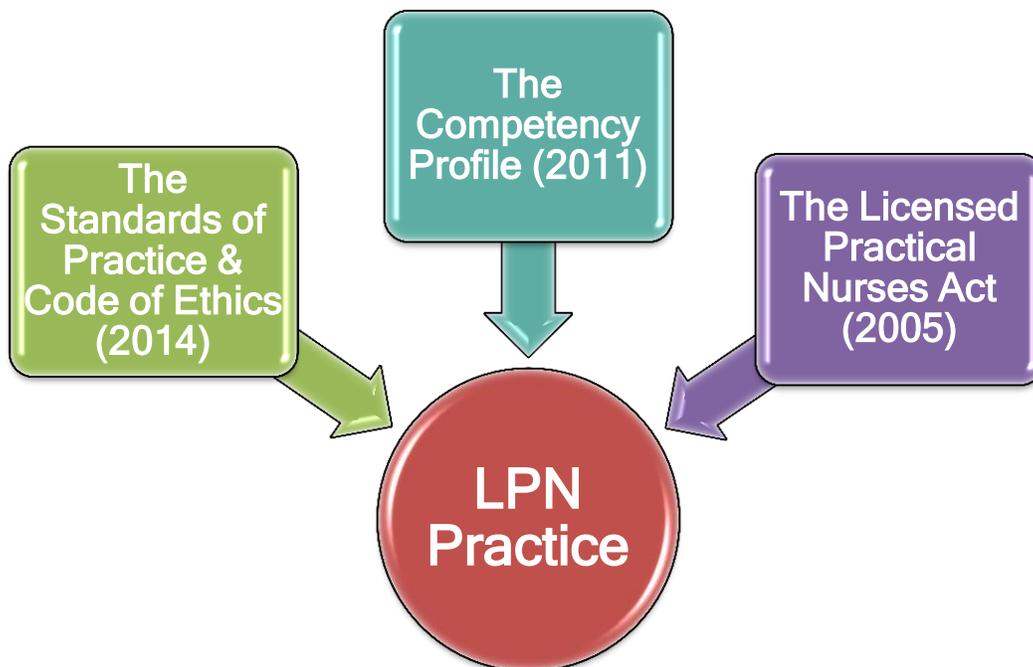
When to Report

Information

various

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The Council for Licensed Practical Nurses of Newfoundland and Labrador (CLPNNL) supports and encourages Licensed Practical Nurses (LPNs) to practice within their professional scope of practice, clinical parameters defined by their employers through policies and procedures and their own individual competencies. They are expected to practice within the following documents:



Licensed Practical Nurses are accountable to recognize situations where the needs of the client are beyond their individual scope of practice or competency. Therefore, they are to consult with the appropriate health care provider to ensure the client receives safe, competent, and ethical care (LPN Act 2005). It is important that LPNs and employers recognize that the client needs and practice context (the setting in which practice takes place) determine the right nurse to provide foot

Documentation engage in care (CLPNNL, 2014).

Documentation is an integral part of nursing practice. It provides an accurate account of the professional services provided to clients when completed in adherence with the LPN Act and Regulations, policies and procedures of the employing agency, and professional accountability as outlined in the CLPNNL

Standards of Practice (2014). A LPN documents only the care he/she provides except in situations where there is a dedicated recorder (CLPNNL).

A LPN maintains documentation that is:

- Clear, concise, and comprehensive
- Accurate and truthful
- Entered in a timely manner
- Client focused and confidential

(Reference: CLPNNL, 2014).

What should be documented?

17. *Assessment*. This includes subjective data (statements or feedback from the resident e.g. resident states, “I have pain in my toe”) and objective data (information that is observed e.g. a reddened toe).
18. *Planning*. Identification of priorities in the resident’s care. Did you notify the RN of an assessment finding such as edema or a wound? What actions will be taken next?
19. *Implementation*. What was done? (e.g. interventions and/or teaching).
20. *Evaluation*. What were the outcomes? What was the resident’s response? Did the intervention work or does it need to be reviewed/revised for the resident’s plan of care? What follow up is needed?

(References: Association of Registered Nurses of Newfoundland and Labrador, 2010; Barry, 2014; CLPNNL, 2014).

Always follow your agency’s policies and/or guidelines on documentation of foot care practices.

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Additional Foot Care Resources

Introduction

In this module you will find additional foot care resources consisting of websites, books, and journal articles. Websites and their links are provided for ease of use. The websites, books, and journal articles contained within this module are current and evidenced based.



Websites

- American Academy of Orthopaedic Surgeons www.aaos.org
- Canadian Association of Wound Care www.cawc.net
- Canadian Diabetes Association www.diabetes.ca
- Canadian Podiatry Medical Association www.podiatrycanada.org
- Centre for Disease Control and Prevention www.cdc.gov/
- Cleveland Clinic www.my.clevelandclinic.org/default.aspx
- College of Licensed Practical Nurses of NL and Labrador www.clpnnl.ca
- Mayo Clinic www.mayoclinic.org
- National Diabetes Education Program www.ndep.nih.gov
- Registered Nurses Association of Ontario www.rnao.ca
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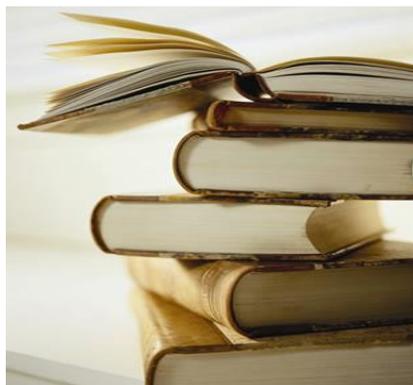
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