



**THE NETHERSOLE NURSING PRACTICE AND RESEARCH UNIT  
EVIDENCE-BASED FOOT AND TOENAIL  
NURSING CARE PROTOCOL**



**Standard statement**

Foot and toenail health is maintained.

**Expected outcomes**

1. The older person's feet will be clean and odor free with soft and hydrated skin;
2. The older person will experience maximized functional ability of the feet;
3. The older person will be comfortable and relaxed.

**Structure standard**

Team members for providing foot and toenail care consist of

1. Registered Nurses

- Conducting foot health management workshop for the frontline staff (Nurses from NNPRU);
- Conducting comprehensive foot and toenail assessment, planning and implementing the foot and toenail care protocol according to individual person's needs (Staff Nurses);
- Managing the foot and toenail care within team;
  - i. Registered Nurses have to closely monitor the condition of their patients and evaluate the effectiveness of the interventions, and ensure the competence level of the Health Care Assistant in performing the basic hygiene care for the patients;
  - ii. Registered Nurses may direct the foot and toenail care by making referral to podiatrist if required
- Liaising and coordinating the foot and toenail care for the older person within the multidisciplinary care team;

2. Health Care Assistants

- Health Care Assistants (HCAs) will be delegated to assist basic foot care for the patients with limited functional ability after training;

3. Podiatrist:

- Conducting hand-on technique or workshop for nurses which aims at enhancing the knowledge of foot and toenail health and complications management for the nursing staff;

- Providing a specialty consultation for complicated foot and toenail conditions, and performing minor surgical procedures;
4. Medical officer:
- Conducting diagnostic tests and managing complicated foot and toenail conditions;
  - Advising and prescribing medical treatments on the immediate and long-term care of the complicated foot and toenail conditions for the older person.

---

**Available resources for foot and toenail care:**

---

**Maintenance of Foot Hygiene**

- Disposal gloves
- Disposable wet towels
- Dry cotton towels
- Toenail clippers
- Emery board and nail files
- Moisturizer

**Promotion of Foot Health Awareness**

- a) Foot Health Handbook for older person
  - b) Foot Care Education Kit(optional):
    - Portable table lamp,
    - Mini-fan
    - Insole and soft pads
    - Nail clipper
    - Emery board or pumice stone, pen and paper
    - Socks and shoes (photos), and measuring tape.
- 

**Process standard**

Assessment

A systematic foot and toenail assessment is taken to assess current foot and toenail health status. The systematic foot and toenail assessment covers three domains including 1) foot conditions; 2) footwear conditions; and 3) self care abilities. The assessment result will be used to identify the current foot and toenail problems and plan an individualized foot and toenail care for the older person. The care will be evaluated and modified continuously during hospitalization. Foot health assessment should be done on admission, then evaluate every week and prior discharge.

(Please refer Appendix 1 for procedural guideline)

Specific guidelines for assessing current foot and toenail health:

There are 3 domains in the Foot Health Assessment, which is used to reflect the health condition of the elderly feet. This assessment is aiming at identifying abnormal condition of the foot, so abnormal conditions are highlighted in each category.

1) Foot conditions:

Four areas will be assessed in regarding to determine the health condition of the foot.

1.1) Dermatologic condition is focused on the skin integrity and nail structure, which include hygiene, appearance, moisture level and nail structure will be assessed;

- Hygiene is used to describe the cleanliness of each foot. Clean means hygiene is maintained, otherwise, presence of odor or dirt is classified as abnormal in this item.
- Appearance is assessing the general skin condition, conditions such as, corn and callous, dry fissure, lesion, rash, infection or blister means altered skin integrity.
- Moisture level is assessing the skin's ability on retaining moisture. Although, the ability is affected by both personal and environmental factors. This item is assessing if the general skin condition is too dry or too moist, which may be considered to be a potential threat on skin integrity and risk of infection. Please pay attention in the areas between toes which always contain extra moisture in summer.
- Nail structure is used to identify if there is any abnormality of the toe nails. Healthy and well-presented nail should be smooth and pink in color, a visible margin (a few millimeters) can be seen in between the nail bed and the head of the nail, toenail should be trim in a straight angle rather than round angle. Since round angle of toenail is more likely to cause ingrown toenail. Also, abnormal structures, including Onychomycosis, thickened toenail, involution, may require special attention.

1.2) Bone structure is used to identify any structural related foot illness;

- Abnormal bone structure may lead to complications such as pain, thickening of skin, and imbalance of walking gait. Common abnormal foot structures are Hallux Valgus (Bunion), Hammer toe, Claw toe, and Flat foot.

1.3) Circulation of the foot is used to detect any insufficiency of blood supply or poor venous return; Temperature, Color and Pulse are used to check the integrity of the peripheral vascular system, while edema may indicate if any insufficiency in returning of body fluid.

- Temperature will be differentiated into either warm or cold. Cold means ineffective blood supply to the extremity, for example, vessel constriction.
- Color is divided into two categories, normal and abnormal. Abnormal means a colour difference has been detected with comparison to other part of the body. The comparison should be done on a similar level of body parts, for example, left foot and right foot.
- Pedal pulse and tibial pulse will be palpated to ensure the blood supply of the lower extremities. Absent of any of the pulse is abnormal.
- Edema, as mentioned, will be act as an indicator of insufficiency of circulatory system. The retained fluid may suggest a potential risk on skin impairment, which is abnormal.

#### 1.4) Sensation is divided into pain and protective sensation

- Pain is an abnormal sensation which alerts an individual on the risk of injury. Intensity and location of the pain should be recorded for evaluation.
- Protective sensation is used to detect any abnormal pressure which may hurt the body. In which, a Modified Monofilament Test will be adopted to assess the protective sensation (Appendix A). Unable to detect the pressure of a 10g monofilament indicates loss of protective sensation.

## 2) Footwear conditions

Both shoes and socks will be assessed in this area, the choices of shoes and socks, size and materials will be used to reflect the footwear knowledge of the older adults. Therefore, shoes and socks must be present at the time of assessment. Inappropriate items should be marked for evaluation and follow-up.

2.1) Shoes: Size of the shoes should be determined by the length and width of the shoes box, which should have a 1.2-1.5cm spaces after fitting and allow free movement of toes. Materials should be breathable, and non-plastic. Assessor should pay attention if any of the items is inappropriate.

2.2) Socks: Size should be stretchable, allow free movement of joints, materials prefer cotton and able to absorb moisture. Assessor should pay attention if any of the items is inappropriate.

### 3) Self care ability

Individual's functional status of foot and toenail care is focused onto assessing patients' functional status in foot and toenail care and determined the level of assistance will be required during hospitalization. In which three items, foot washing, toenail trimming and change of footwear will be assess during hospitalization. Items require assistance should be marked for attention.

In the Foot Health Assessment, the result is classified into normal or problem(s) identified which indicated with tick(s) in the assessment form.

- No tick identified in the assessment form means foot condition is healthy, footwear is appropriate and independent in the foot and toenail care. Patient requires basic foot care only.
- Any tick(s) identified mean(s) problem(s) identified in the assessment. Patient may require basic and advanced foot care, which depend on the score allocation. Health care assistant may need to assist the basic foot care for the patient who has limited functional ability.
- The number of ticks can be used not only a reflection on the foot health condition, in which more ticks mean poorer foot health condition; but also an evaluation on effectiveness of nursing intervention, in which decreasing in the number of ticks mean improving of the foot condition or vice versa through a weekly based comparison.

This is the end of the assessment; however, any evidence of acute orthopedic emergency, such as fracture or sprain, unrelieved sharp pain identified during assessment. The conditions should be reported to Medical Officers for immediate consultation.

### Planning

The foot and toenail care is divided into two levels, basic and advanced. Basic care is daily routine care for all the patients, while advanced care is designed for those have particular problems. For the patients have limited functional ability, HCAs will be delegated to provide basic foot care.

In the planning stage, nurses need to determine objectives, and select appropriate interventions according to the problems identified in the assessment. Nurses should also exercise their professional knowledge and judgment in planning the care for their patients.

In basic foot care, objectives are to maintain comfort and hygiene of skin/toenail/footwear; and to provide health education to promote the awareness of foot health among patient and relatives.

In advance foot care, 8 identified objectives and interventions have been suggested. They are 1) to maintain skin hygiene and moisture level of the foot/ feet; 2) to reduce discomfort due to corn and callus; 3) to maintain a suitable length and thickness of toenail; 4) to correct alignment of the foot/ feet and minimize complications; 5) to promote lower limb circulation; 6) to reduce pain; 7) to minimize complications secondary to loss of sensation; and 8) to promote the footwear knowledge of the patient.

A number of interventions have been suggested under each objective. However, they are not necessarily suitable for all the patients. Nurses should take consideration on the result of the Foot Health Assessment, current health conditions and past medical history of the patients.

### Implementation

Venue for foot and toenail care:

Bathroom or bedside; Foot and Toenail Care is provided incorporate into ward routine.

Foot and toenail care procedure:

#### Basic foot Care (refer Appendix 2)

Foot care is a basic need of human beings. It affects self image and psychosocial well-being of a person. So, Basic foot care is aiming at maintaining a good foot hygiene and comfort on footwear. Since this protocol is written specifically for in-patients. Basic foot care is divided into two perspectives, action and knowledge. Objective one is to maintain comfort and hygiene of skin/toenail/footwear; objective two is to provide health education in promoting the awareness of foot health among the patient and relatives, both of the objectives are designed to enhance personal experience and knowledge of foot care.

*Objective 1: To maintain comfort and hygiene of skin/toenail/footwear*

For independent patient, he or she will be encouraged to perform foot wash, toenail trimming, and change of footwear by self. Otherwise, HCA may assist to provide basic foot care for the patient.

Step 1: Foot wash is assumed as part of the bathing schedule, patient or HCA has to pay attention to the area between toes, where is a common area of fungal infection.

Step 2: Foot wash can be done with a wet towel at the bed side and then dried thoroughly with a dry towel. Gaps in between toes are usually retaining excessive moisture, which require extra attention. Number of foot wash should is depended on the patient's skin condition.

Step 3: Moisturizer can be used if the feet is too dry or dry fissure can be seen on the heel area. Avoid putting moisturizer on the plantar surface, which may lead to fall.

Step 4: Trimming toenail should be done on a regular basis; however, toenail grows relatively slower than the fingernail. A suitable length is described as a visible margin between the edge of the nail and the nail bed, which is around 2-3 millimeters. Long toenail may stick into the footwear and create pressure on the toe; Short toenail may lessen the protection of the toe. Also, the edge of the toenail should be remained straight to avoid ingrown toenail, which is an injury caused by inappropriate growth of the toenail.

Step 5: Changing socks everyday is recommended.

Step 6: Foreign bodies should be removed from the shoes to prevent accident or trauma of the feet.

*Objective 2: To provide health education in promoting foot health knowledge among the patient and relatives*

Step 1: An Elderly Foot Health Education Booklet will be given to the patient, in which, information on the foot care and common foot problem are illustrated in both words and pictures to enhance the learning process.

Step 2: For the elderly has lower literate level, healthcare professional is advised to go through the first 3 chapters with the older adult.

Step 3: Both patient and relatives are encouraged in participating the basic foot care which should be maintained as daily routine even after patient's discharge.

### Advanced foot care

Advanced foot care is only indicated if foot problem(s) identified. The management is an advanced level of care, which requires supervision of healthcare professionals. As mentioned, there are eight suggested objectives in this section; each of them is corresponding to the problem identified in the foot health assessment. Apart from the self-care ability, there are 5 main problem areas: skin, bone, circulation, sensation and footwear.

Under each problem, objectives and care strategies are suggested. In which, the nurse is required to select appropriate objectives and strategies to improve patient's foot condition.

Problem area: Skin

*Objective: Maintain skin hygiene and moisture level of the foot/ feet*

(Refer to the Geriatric Nursing Care Plan: Foot Ulcer)

- Wound management is one of the major priorities in foot care. Nurse should adopt the Geriatric Nursing Care Plan: Foot Ulcer in adjacent to the care suggested in this care plan, in the presence of wound or skin breakdown.
- Healthy skin should be clean and moist, so patient fall in this category means skin moisture is abnormal or not clean. Depending on the situations of the skin, intervention on dirty skin, dry skin and wet skin (between toes) has suggested.
  - First, keep clean and maintain moisture. Basic foot care is a fundamental care management, while good foot hygiene should be maintained in accompany with good footwear hygiene, which may be the source of infection.
  - Second, skin moisture should be maintained at a normal status, too wet or too dry is not recommended. For sweaty skin nurse can use small amount of alcohol to help vaporization of retaining moisture between toes and separate toes with gauze. For dry skin, patient is advised to maintain skin moisture level by performing basic foot care everyday.
  - Third, patient can strengthen their knowledge with the Elderly Foot Health Education Booklet page 9, "Care and Prevention on *Tinea Pedis*
  - Forth, any suspected infection should be acknowledge the Medical Officer for further management.



*Objective: Reduce discomfort due to corn and callus*

- Corn and callus is one of the common foot problems among elderly.
  - First, conservative measures should be used. For example use of warm bath and pumice stone to remove corn and callus.
  - Procedures:
    1. Allow foot soaking in warm water for 3-5 minutes, then use file or pumice stone to remove excessive dead skin or cuticle.
    2. Apply emulsifying ointment on hard skin surface to smooth and soften the skin.
  - Second, nurse can choose appropriate corn pad or cut a suitable size foam pad and apply onto the affected areas to avoid or minimized discomfort and occurrence of corns and callus. Nurse may direct the care by making referral to podiatrist depends on the conditions severity.
  - Third, patient's can improve the knowledge on the Care of Corn and Callus with Elderly Foot Health Education Booklet page 10-11.
  - Forth, for complicated corn or callus, such as hemorrhage, or changed to brown color, nurse should refer the care to Podiatrist for special care or minor surgery.

*Objective: Maintain a suitable length and thickness of toenail*

- Thickened toenail is a common problem of ageing feet. With decrease in functional status (e.g. poor eye sight, unable to bend the back) in older adults, thickened toenail becomes difficult to manage. Also, onychomycosis, fungal infection of toenail, is another common foot problem which leads to change the shape and structure of toenail. A visible margin and straight edge of the toenail is necessary to prevent complication and ensure comfort of the feet.
  - First, a suitable length of toenail should be maintained. For short nail, it is recommended to check the nail's length per week to observe possible ingrown toenail. For long nail, HCA can assist to cut the nail, while the nurse should check the nail is cut into appropriate length and shape.
  - Procedure:
    1. Allow foot soaking in warm water for 3-5 minutes
    2. Trim toenail with special nail cutter
  - Second, a suitable thickness of toenail should be maintained. Sometime, thicken toenail is hard to manage, using nail file to file the thicken nail is easier than cut it. Filing of nail is one of the important management strategies, which can be done twice weekly to limit the growth of the toenail.

- Techniques:
  1. Apply the nail file on the head of the toenail.
  2. Push the nail file FORWARD only
  3. Avoid backward motion, which may pull the toenail up.
- Third, patient's can improve the knowledge on the care and prevention of Onychomycosis and Thickened toenail with the Elderly Foot Health Education Booklet page 14-16.
- Forth, severer thickened toenail or ingrown toenail should be referred to Podiatrist for management.

Problem area: Bone

*Objective: Correct alignment of the foot/ feet and minimize complications*

- Abnormal bone structure is a leading cause of foot pain, which can be reduced by realign the foot into correct position, while prescription of special splint require Podiatrist's consultation and prescription.
  - First, using conservative measure to relieve the discomfort caused by the abnormal bone structure, such as applying simple foam pad on pressure areas.
  - Second, patient's can improve the knowledge of Hallux Valgus and Overlapping toes with the Elderly Foot Health Education Booklet page.17-20
  - Third, consideration on using suitable splint and long-term management should be made by referring to Podiatrist.

Problem area: Circulation

*Objective: Promote lower limb circulation*

- In general, poor circulation can be improved with appropriate clothing and exercise;
  - First, patient can wear cotton socks to reduce the heat loss.
  - Second, patient can perform gentle foot exercises help to enforce the blood circulation. A series of foot exercises has been detailed described in the Elderly Foot Health Education Booklet page.7-8
  - Third, patient can improve the knowledge on the care of the foot edema with the Elderly Foot Health Education Booklet page 21.
  - Forth, Leg edema should be reviewed everyday and inform Medical Officer for detail assessment, determine on the appropriate use of Tubigrip.

Problem area: Sensation

*Objective: Reduce pain* (Refer to the Geriatric Nursing Care Plan: Pain)

- Foot pain can be divided into three regions, fore-foot, mid-foot and heel. Their causes are different, and pain concept is complicated. So, nurse should adopt the Geriatric Nursing Care Plan: Pain as a guideline on the foot pain management.
  - First, conservative measure with soft pad or insole can be put use as a cushion to relieve the pressure on feet.
  - Second, patient can perform gentle foot exercises (Elderly Foot Health Education Booklet page.7-8) to help strengthen of the feet.
  - Third, patient can improve the knowledge on the care and management of Foot pain with the Elderly Foot Health Education Booklet page. 22-23).
  - Forth, if pain is intense, referral should be made to physiotherapist.

*Objective: Minimize complications secondary to loss of sensation*

- Loss of protective sensation is one of the major risks of foot ulceration, especially in patient with DM, it is recommend to inspect skin condition everyday. And inform Medical Officer and refer Podiatrist for detailed assessment and evaluation.

Problem: Footwear

*Objective: Promote the footwear knowledge of the patient.*

- On top of the basic foot care, patient should be encouraged to use appropriate footwear for daily activities.

### **Outcome Standard**

The elderly should

1. Understand the aim of foot and toenail care
2. Able to return demonstrate or describe the procedures depend on the patient's functional status
3. Assume their responsibilities of foot and toenail care
4. Understand and able to choose appropriate footwear
5. Understand and aware of abnormal foot and toenail conditions, which require medical consultations

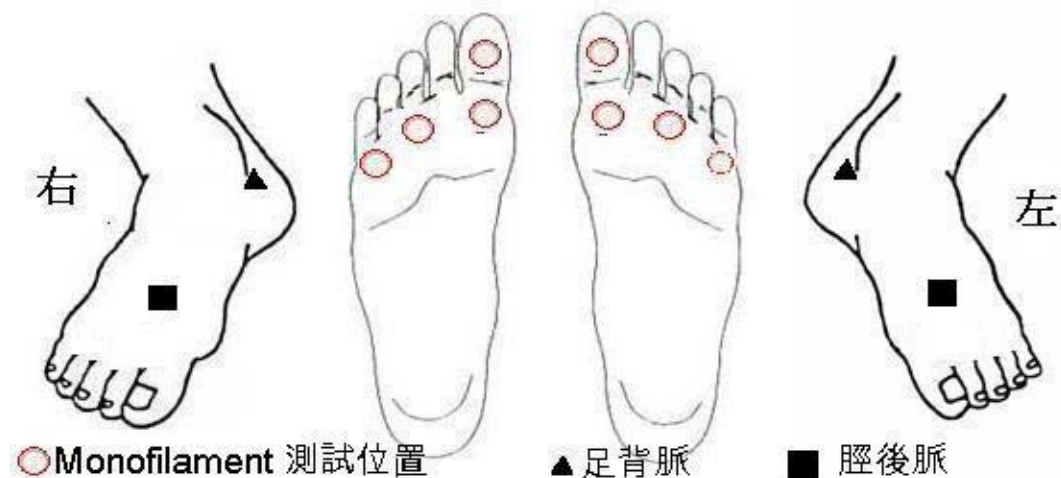
## Appendix 1

### Modified Monofilament Test

- i. Modified Monofilament test is based on a study result by Lee, Kim, Choi, Park, Kim and Cho (2003).
- ii. Four testing sites would be used a) 1st Metatarsal Head, b) 3rd Metatarsal Head, c) 5th Metatarsal Head, and d) First Metatarsal Phalangeal Joint
- iii. Monofilament with 5.07/10-g force pressure will be used as it is the best indicator of protective sensation according to previous studies (Birke et al cited in Lee et al 2003)

#### Testing procedures

- The SW monofilament was pressed perpendicular to the test sit with enough pressure to bend the monofilament for 1 sec.
- Ask the patient if they can feel the pressure.
- Abnormal if they cannot sense the pressure.



Source: RFCA Foot Assessment Form, Government of Manitoba (reprint with permission)

**Reference:** Lee, S., Kim, H., Choi, S., Park, Y., Kim, Y. and Cho, B. (2003) Clinical Usefulness of the Two-site Semmes-Weinstein Monofilament Test for Detecting Diabetic Peripheral Neuropathy. *Journal of Korean Medical Science*. 18, 103-107.

**Appendix 2**

**Procedural guidelines on Basic Foot and Toenail Care**

**Basic equipments:**

- |                            |                     |
|----------------------------|---------------------|
| 1. Disposal gloves         | 6. Dry towel        |
| 2. White basin for soaking | 7. Toenail clippers |
| 3. Warm water              | 8. Emery board      |
| 4. Moisturizing soap       | 9. Lotion           |
| 5. Soft wash cloth         | 10. Pillow          |

**Foot care procedures:**

	<b>Action</b>	<b>Rationale</b>
Skin care	<ul style="list-style-type: none"> <li>• Explain to the procedure and check if your patient has any allergy</li> </ul>	<ul style="list-style-type: none"> <li>• Orientate the patient to reduce anxiety;</li> <li>• Gain co-operation;</li> </ul>
	<ul style="list-style-type: none"> <li>• Assemble equipment;</li> <li>• Sit the patient in a stable and comfortable position;</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure patient safety;</li> </ul>
	<ul style="list-style-type: none"> <li>• Wash your hands and apply gloves;</li> </ul>	<ul style="list-style-type: none"> <li>• Universal precautions;</li> </ul>
	<ul style="list-style-type: none"> <li>• Fill half of the basin with warm water, and test the temperature;</li> <li>• Wash the feet with mild antibacterial soap;</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid extreme temperature which may hurt the elderly feet</li> </ul>
	<ul style="list-style-type: none"> <li>• Rinse well to ensure all soap is removed;</li> <li>• Remove feet from the basin and place directly onto a clean towel;</li> <li>• Pat dry thoroughly; paying close attention to between and under the toenails;</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent moisture accumulation and reduce risk of fungal infection;</li> <li>• reduce friction force which may damage thin and fragile skin in older people</li> </ul>

	<b>Action</b>	<b>Rationale</b>
Skin care (cont'd)	<ul style="list-style-type: none"> <li>• Lightly applying moisturizer or foot cream, massaging into the patient's foot;</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain skin moisture;</li> </ul>
Special consideration for people with joint stiffness	<ul style="list-style-type: none"> <li>• Insert a pillow beneath the older person's knee to provide support, and cushion the rim of the basin with the edge of the towel to prevent pressure;</li> <li>• Provide passive ROM exercise during warm foot bath;</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain body alignment and reduce pressure points</li> </ul>
Toenail care	<ul style="list-style-type: none"> <li>• Trim toenails straight across;</li> <li>• File the toenails and maintaining a straight edge.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent ingrown toenail;</li> </ul>
Footwear	<ul style="list-style-type: none"> <li>• Place wool or cotton to protect areas that are rubbing or irritated;</li> <li>• Put on clean cotton socks after foot care;</li> <li>• Check your patient's shoes if there is any foreign body or sharp edges.</li> </ul>	<ul style="list-style-type: none"> <li>• Protect and maintain skin integrity, and temperature</li> <li>• Prevent foot injury;</li> </ul>
After care	<ul style="list-style-type: none"> <li>• Remove and clean all equipment, and wash hands</li> <li>• Documentation.</li> </ul>	
Health education	<ul style="list-style-type: none"> <li>• Teach patient with reference to the elderly foot health booklet provided ;</li> <li>• Observe patient's behavior and reinforce the foot care technique if necessary</li> <li>• Evaluate patient's knowledge during re-assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Improve patient awareness on foot care</li> <li>• Provide opportunities for foot care and assume patient responsibility</li> </ul>

**References:**

- Bryant, J.L. & Beinlich, N.R. (1999). Foot care: focus on the elderly. *Orthopaedic Nursing* 18(6), 53-60.
- Bryant, J.L. & Beinlich, N.R. (2003). How to start a nurse-managed foot care clinic. *Orthopaedic Nursing*. 22(6), 437-441
- Carpenito-Moyet, L. J. (2008). *Application to Clinical Practice* Lippincott Williams & Wilkins.
- Hospital Authority. (2001). *Guidelines for Nursing Services* Hospital Authority, Hong Kong.
- Lee, S., Kim, H., Choi, S., Park, Y., Kim, Y. and Cho, B. (2003). Clinical Usefulness of the Two-site Semmes-Weinstein Monofilament Test for Detecting Diabetic Peripheral Neuropathy. *Journal of Korean Medical Science*. 18, 103-107.
- Pattillo, M.M. (2004). Therapeutic and healing foot care: a healthy feet clinic for older adults. *Journal of Gerontological Nursing* 30(12), 25-32.
- Popoola, M.M., Jenkins, L. & Griffin, O. (2005). Caring for the foot mobile: holistic foot and nail management *Holistic Nursing Practice* 19(5), 222-227.
- United Christian Hospital. (2008). *Diabetic Foot Care*. Podiatry Department, United Christian Hospital.
- Warner, I. (2003). Nursing and long-term care concerns of foot care in the elderly *Clinics in Podiatric Medicine and Surgery* 20(3), 383-394.
- Woodrow, P., Dickson, N. & Wright, P. (2005) Foot care for non-diabetic older people *Nursing Older People* 17(8), 31-38.