The ability of thermographic in predicting diabetic neuropathic foot ulceration c...

Health & Medicine



The paper "Thermographic in Predicting Diabetic Neuropathic Foot Ulceration vs Standard Diagnostic Methods" is a forceful example of a literature review on health sciences & medicine. A foot ulcer is a red crater that occurs on the surface of the skin. Diabetic foot is a complication of diabetes. It occurs as an effect of ulceration, associated with neuro therapy or peripheral arterial disease. Diabetic foot ulceration is a major health problem that requires a multidisciplinary approach in its management. These complications begin with neuropathy and later diabetic foods that frequently lead to infection and might result in amputation.

Prompers and Huijberts (2008) claim that diabetic foot disease includes neuropathy, peripheral arterial disease, and infection which in the presence of a motivating factor, leads to ulceration and subsequent amputation. Osteoarthropathy and Charcot foot disease are other complications resulting from neuropathic risk factors. A number of techniques are used in the diagnosis of foot ulcers. They further assert that these methods include; microbiological sampling, this is a traditional method used to determine the causative agents that cause wound infections. The method involves rubbing wound surface with a cotton swab, aspirating purulent secretions and biopsy. Tissue biopsy is the reference standard for diagnosing disease.

In their work, Lavery and Higgins (2007) argue that hematologic and biochemical markers-this diagnostic method involves blood test such as white blood cells count, erythrocyte sedimentation and C - reactive protein level. This method is not effective since not all patients with deep foot infection have leukocytosis hence average results do not preclude infection.

Radiological diagnosis of osteomyelitis

This diagnostic method involves techniques that refute the presence of bone infection and detection of gas in soft tissues. The presence of osteolytic bone changes and periosteal elevation are an indication of osteomyelitis. However, these results may not be accurate and require further investigations such as an isotope bone scan or labeled white blood cells scan, infrared thermography, and ultrasound. Clinical diagnosis of infectionthis method involves clinical evaluation where the patient is asked about the increase in pain, odor or exudates. The method is not effective as the patient might be unable to tell a difference in how they are feeling and hence relying on the patient's information can be inaccurate.

Parrella and Hiller (2005) found out that a thermographic inspection is the most preferred diagnostic method of foot ulceration. It is a testing of parts, materials, and systems that are non-destructive. It uses radiation images called thermograms. Emissions monitor physiological changes in human beings. The authors claim that thermography has a number of advantages which makes it preferred to other diagnostic methods used in diabetic foot ulceration. They include: it shows a visual picture, it catches Moving Targets in real-time, it is not destructive, it detects in dark areas.

In the work by Bharara and Cobb (2006), it is clear that thermography includes these tests in determining whether one is infected with neuropathic

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foot ulceration. Blood tests, Bacterial cultures of the ulcer, X-rays, Magnetic resonance imaging (MRI), a computed tomography (CT) scan and bone scan. Thermography and thermometry are applied in lower extremity wounds, vascular complications, and neuropathic complications that result in improved imaging software and transducer technology. Thermographic is applied in the three techniques that are used to determine the risk of foot ulceration. These techniques are the assessment of circulation, neuropathy and foot pressure.

Another type of thermography used in the determination of neuropathic foot ulceration is liquid-crystal contact thermography (LCT). This method is advantageous over the traditional methods of determining motion, neuropathic diabetic foot ulceration since it is inexpensive and non-invasive. Bharara and Cobb (2006) point out that this method is used to assess the mean plantar foot temperature to determine the likelihood of neuropathic diabetic foot ulcer; LCT technology gives information regarding the warmth distribution of the foot. It uses a colored foot imprint on a plate comprised of layers of encapsulated thermochromic liquid crystals. An advantage of the technology is that it clearly visualizes problem areas as leading to better compliance with therapeutic advice in foot care among the diabetic. LCT offers rapid temperature imaging as compared to other standard methods.

Scanning of foot temperature with IR thermometer is another thermographic method that is used in the determination of neuropathic diabetic foot ulceration monitoring the foot temperature is paramount in determining the

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as compared to the standard therapy method. This method is economic friendly. At The National Horizon Scanning Unit, Australia made an assessment of the local cost of foot implications. They recommended the TempTouch for home monitoring of diabetic patients and especially in the rural areas. Lavery et al., (2007) said that temperature control could most probably reduce the incidence of foot complications.

Parrella and Hiller (2005) established that the thermographic methods are efficient in the diagnosis due to the complexity and sophistication as this makes them yield better results such as vibratory testing with a 12-Hz tuning fork, examine Achilles tendon, Monofilament examination and vascular examination. The thermographic methods are efficient as compared to the standard methods as they give accurate results. The standard methods lead to misdiagnosis in most cases leading failure to heal and devastating consequences hence. Thirdly, their thermal imaging is safe for use on patients as it has no side effects upon repeated use.