

Health dissertation ideas – applied musculoskeletal podiatry

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Introduction Pathology that causes metatarsalgia

Morton's Neuroma can be described as a perineural fibrosis and nerve compression of the common digital nerve. This condition often occurs in the second and third intermetatarsal spaces, although it can be seen in other intermetatarsal spaces (Pace, Scammell and Dhar, 2010). According to Adams (2010) neuroma may be bilateral, are more prevalent in female adults starting their third decade of life. Whilst the actual cause of Morton's neuroma is not clear, it is believed to be associated with hypermobility of the metatarsals, in addition to repetitive motions which ultimately grind nerves in metatarsals. There are suggestions from anecdotal studies that Morton's neuroma is directly linked to crush injuries or repetitive running or jumping motions. The results of such repetitive actions may lead to damage or injury on the area of the forefoot.

There is also the possibility of structural misalignment and mechanical abnormalities that may be experienced at the forefoot, which may consequently lead to creation of symptomatic Morton's neuroma (Pace, Scammell and Dhar, 2010). Structural misalignment in this case may refer to lateral compression of foot, which can lead to invariable pain when inflamed bursa is squeezed between the metatarsal heads. Hauser (2011) observes that one of the most common structural concerns is the possibility that lax in intermetatarsal ligament may cause inter-digital nerve tissue to shift into a wrong place, particularly in between the areas of metatarsal heads and be subject to comprehensive trauma.

The common subjective history based on patients' reports is usually characterised by numbness and tingling, and radiating and burning pain. Patients' reports also suggest that the pain is localised at the plantar aspect of the specific intermetatarsal space, although it can also extend itself and radiate into other adjacent toes of the infected person (Berry, Gonzalez, Bowman, 2012). Patients often describe their feeling of “ lump” on the foot's bottom. Significantly, these symptoms may rise when the infected carries out a weight-bearing activity. Reports indicate that closed-toed shoes, particularly the tight-fitting ones can lead to increase in symptoms, and patients report relief after they remove or change their shoes (Summers, 2010). Relief may also be experienced when the patient massages their foot or moves the toes around.

Aetiology of this condition and how it would be recognised clinically

Research has established that Morton's neuroma is unique in terms of clinical diagnostic requirements or needs (Drury, 2011). This is because although patients frequently report symptoms such as numbness, there is evidence that sensory deficit may or may not be found when the patient goes through examination. Drury (2011) observes that there may be a demonstration of splaying or divergence of the digits when clinical presentation is carried out, and that more often than not little or no edema or inflammation can be observed clinically. Typically, reproducing pain with palpation to the intermetatarsal space is a normal activity, but care must be taken to put the pressure in the space, and avoid the metatarsal heads.

There have been various clinical strategies to assist clinicians effectively diagnose Morton's neuroma. Schreiber et al (2011); Faraj and Hosur (2010) report that patients may demonstrate a Mulder's sign, which is provoked by squeezing the forefoot and conducting application of plantar and dorsal pressure. In other words, clinical test for Morton's neuroma has all along been to compress the foot by applying pressure to the medial and lateral aspects of the foot at the metatarsophangeal joints, which in turn puts pressure on nerves (Pastides, El-Sallakh and Charalambides, 2010: 503).

A positive clinical test outcome involves a pop or click that can be felt and heard at the same time. This pop or click is usually painful to the patient. There is a possibility of replicating symptoms of Morton's neuroma in a process involving Gauthier' test, where the forefoot is squeezed and medial to lateral pressure is applied (Beltran et al., 2010). Mayo Clinic (2010) has subsequently described a test consisting of hyperextending the toes and rolling the thumb of the examiner in the area of symptoms, a process that may identify a tender, thickened, and longitudinal mass of flesh. Clinical findings also indicate that Morton's neuroma may also show Tinel's sign as well as Valleix phenomenon (Berry, Gonzalez and Bowman, 2012).

The other pathway for detecting Morton's neuroma is diagnostic testing. This process involves plain radiography, ultrasound, and magnetic resonance imaging (Summers, 2010). Radiographs are routinely ordered to rule out musculoskeletal pathology, even though rise in proximity of the adjacent metatarsal heads is believed to result in increased pressure of the intermetatarsal nerve. Furthermore, Hause (2010) found no significant

correlation between radiographic findings and the clinical presence of neuromas.

In addition, there is the recommendation to use ultrasound in the diagnostic evaluation of the interspaces (Hause, 2010). Drury (2011: 19) observes that there is a likelihood of a neuroma appearing as an ovoid mass with hypoechoic signal-mass to the long axis of the metatarsals. . Adams (2010), however, advises that although MRI is a useful diagnostic tool, it should always be reserved for atypical presentations or to eliminate multiple neuromas. Significantly, neuroma can be best identified on T1 weighted images, and it's likely to come out as a well-demarcated mass with minimal signal intensity. In summary, clinical diagnostic approach to identify Morton's neuroma can be achieved by ensuring that examination and diagnostic testing has ruled out any other etiologies of symptoms.

Conservative treatment intervention for Morton's neuroma

No best treatment interventions have been identified in the literature for treatment of Morton's neuroma. Conservative intervention for Morton's neuroma is considered to be one of the best treatments alternatives for the condition. However, some of the common conservative treatment options involve changing shoe type, use of metatarsal pads, and use of non-steroidal anti-inflammatory drugs, administering sclerosing alcohol injections, and surgically transposing the offending nerve (Summers, 2010). Many doctors and physical therapists have recommended that patients are put to rest for a specific period of time, and reduce activities that may elicit pain (Pastides, El-Sallakh and Charalambides, 2012).

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Injections as an intervention

Various clinical studies have exposed the need to consider injection as a better treatment option for Morton's neuroma over other non-surgical treatment options available. In a study conducted by Drury (2010) different conservative treatment measures often produce similar results. In a small randomised prospective study of 23 patients, the researchers compared reduction in neuroma pain when supinatory or pronatory insoles are used. In the study, there was no explicit inclusion or exclusion criteria other than clinical diagnosis, and no participant or evaluator was considered blind to the intervention allocations. The study had 13 percent of the participants (two patients) drop out after one month into the experiment. After 12 months, pain in the supination and pronation insole groups reduced by 50 percent and 45 percent, respectively- a reduction considered insignificant.

In another study, a physically active 25-year-old female with diagnosed symptomatic Morton's neuroma was put through a massage therapy sessions. The six-session massage therapy involved a 60-75 minute weekly massage exercise involving postural alignment in addition to localised foot and leg treatment. The patient was also put to complete at-home daily exercise, with a weekly monitoring of change by the therapist who reassessed the patient's posture and ensuring the client fills out a pain survey based on a Visual Analog Scale. The results indicated progressive change on the side of the client in terms of pain character. Specific patient report indicates that the pain character changed from burning and stabbing

to dull and pulsing sensation after three sessions. There was also a reduction in pain during exercise.

Although this study suggests that massage therapy is a significant treatment for Morton's neuroma, its weakness is based on the fact that the treatment only involved one client. No study has indicated the effectiveness of the method on a larger randomised control studies.

In a prospective randomised study involving 82 patients, the researchers compared steroid injections alone based on shoe modifications (Berry, Gonzalez and Bowman 2012). Some of the recorded primary outcomes were patient satisfaction, which is basically the presence or absence of pain, the pain intensity, and return of pain afterwards.

The results of the study indicated that steroid injections yielded better outcome in terms of patient satisfaction, compared with other conservative options such as shoe modifications alone. In this study, 23 percent of shoe-modification patients achieved complete satisfaction after one month of intervention. This was significantly lower than the 50 percent of patients who experienced significant pain reduction after one month of steroid injection. After six months, 28.6 percent of the participants experienced satisfaction with shoe modification, significantly lower than 73.5 percent satisfaction amongst those who had received injection.

Although the difference was significant lower after one year with 63 percent satisfaction with shoe modification and 82 percent with injection, the reduction could have occurred because patients were allowed to cross over

after six months. The researchers observed that no complications were reported, although the study was limited by a high cross-over rate from shoe modification group to injection group after 6 months.

Some studies have investigated other techniques such as the use of sclerosing effects of alcohol (Pastides, El-Sallakh and Charalambides, 2012; Schreiber, 2011; Beltran, 2010; Pace, Scammell and Dhar, 2010), where delivery is done by multiple injections guided by ultrasound techniques over time. Improvements were reported in terms of clients' satisfaction with no long-term adverse effects in various case series.

It is mostly recommended that even as an injection is used as the chosen treatment option, other supplementary management options such as shoe adjustments and calf-stretching exercises should also be implemented concurrently. However, in case the conservative interventions fail to work, many patients may be advised to undergo surgery to remove the neuroma or just to release pressure from ligaments. Studies have, however, indicated that 15 to 20 percent of these surgeries will not relieve the patient from pain, and may also lead to various complications such as local post-surgery infections, scar tissue, and damage of soft tissues which may affect normal foot functions. It has also been established that there is a possibility of neuroma recurring after the surgery.

Conclusion

Whilst the exact cause of Morton's neuroma is not known, the common belief is that it is caused by hypermobility of the metatarsals. This may also be

aggravated by repetitive motions involving grinding of nerve bundle. The common symptoms are patients describing their feeling of “ lump” on the foot’s bottom. These symptoms may increase when the patient engages in weight-bearing activity.

Research has established that symptoms that may be associated with Morton’s neuroma may not necessarily mean a person is suffering from the complication. This is why clinical diagnosis is often recommended. One of the most common clinical strategies that may be beneficial to clinicians diagnosing Morton’s neuroma is patients demonstrating Mulder’s sign. A positive clinical test outcome involves a pop or click that can be felt and heard at the same time. Clinical findings also indicate that Morton’s neuroma may also show Tinel’s sign as well as Valleix phenomenon (Berry, Gonzalez and Bowman, 2012).

Although there are various conservative therapies used to manage Morton’s neuroma complications including rest, weight loss, and exercise for muscle strengthening, orthotics, massage therapy, physiotherapy, and manipulation, these methods are found to be very effective. It’s against this backdrop that injection is found to be a more effective way of managing the complication as reported by clients’ satisfaction studies. Injection may involve steroid injection, local anaesthetic injections or sclerosant injections. Injections have been found to yield better outcome in terms of patient satisfaction, compared with other conservative options such as shoe modifications alone. It has also been established that there are no complications reported in injections. Medical practitioners, however, recommend that patients may be

advised to undergo surgical intervention in case conservative interventions fail to yield desired results.

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