Dynamic Chiropractic

ORTHOTICS & ORTHOPEADICS

Repetitive Stress and Orthotic Support

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A neuroma is a benign overgrowth of a nerve. Morton's neuroma develops in the space between the metatarsal bones of the foot. The most common locations are between the third and fourth metatarsals (in the third web space), and between the second and third metatarsals (second web space). Most interdigital neuromas are caused by abnormal foot biomechanics and will respond well to conservative chiropractic care with orthotic support. Occasionally, referral for surgical excision is necessary for recalcitrant cases.[1] This condition commonly is found in athletes and those who place substantial stress on their feet and toes.

Nerve Protection

The digital nerves of the foot (which branch from the medial and lateral plantar nerves) travel between the metatarsal bones distally to innervate the toes. If these nerves are acutely or chronically irritated, they will respond by encasing themselves in a fibrous protection. This results in a gradual nerve thickening and enlargement. The nerve gets annoyed by repetitive biomechanical stress (most commonly, excessive pronation), so it builds a protective sheath. If abnormal stress continues, the enlargement grows and becomes compressed between the metatarsal bones and interferes with nerve transmission.

Pain and Discomfort

There are two varieties of presenting symptoms:[2]

> *Acute:* This may occur in a sprinter or a cyclist who presents with an electric-shock pain radiating from the forefoot down to the toes (usually the third and fourth toes). The athlete will rub the bare foot to relieve the burning, numbing pain.
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> *Chronic:* A patient reports a dull discomfort under the foot which feels like a wadded-up sock. This progresses to an intermittent, cramping pain which is aggravated by extended standing or walking. The onset is frequently insidious, with no cause or specific triggering activity identified. There often is a gradually expanding area of numbness along the inside of the involved toes. Occasionally, two interspaces are involved, making localization more difficult.

Tests and Evaluations

Examination of the foot and toes will find variable sensory changes to pinprick and light-touch testing. Passive extension of the metatarso-phalangeal (MTP) joints might increase the pain or recreate the numbness/burning into the toes.[3] Palpation and motion testing of the forefoot should be performed, looking for "dropped" or sensitive metatarsal heads. The soft tissues between the metatarsals are palpated, checking for tenderness and swelling, or a mass.[4] Occasionally, a "clicking mass" is felt in the symptomatic interspace.[5]

Morton's test is a provocative maneuver for an interdigital neuroma. Squeezing the metatarsal heads (transverse pressure) often will cause a sharp pain in the forefoot.[6] While not specific for a neuroma, this test does give an indication of biomechanical stress in the forefoot and problems with the transverse arch.

Evaluation should include a weight-bearing examination of the foot during stance and gait, looking for evidence of excessive pronation and collapse of the anterior transverse arch. Shoes and athletic footgear should be checked for excessive tightness around the forefoot, and abnormal wear patterns.

Forefoot Dysfunction

The most common cause of an interdigital neuroma is biomechanical dysfunction of the forefoot, specifically excessive rotational and transverse movements of the metatarsals.[7] This usually is due to excessive pronation, but occasionally is seen with a supinated (high-arched) foot. Pelvic and lumbosacral involvement must be checked in all cases, since the plantar nerves originate in this region.

Care and Support

Specific adjustments of all lumbosacral and foot/ankle joint dysfunctions with special attention paid to the metatarsal heads. Most commonly seen are intermetatarsal fixations and dropped metatarsal heads. Inflammation of the nerve in the web space can be handled conservatively, using cryotherapy and electrotherapy as needed.

Metatarsal support consisting (initially) of a temporary metatarsal pad will help to open up the intermetatarsal space and relieve pressure on the digital nerve. Comprehensive care should address the underlying biomechanical problems of the entire foot with a custom-made orthotic designed to improve foot function through all phases of gait: heel strike, midstance and toe-off.

Shoes should be assessed to eliminate compressive forces on the forefoot. Often, athletic shoes are fitted much too tight. This can contribute to and exacerbate any tendency to pronation or rotational stress on the metatarsals.

Custommade orthotics are necessary to provide support for the arches and reduce the pronation stresses on the forefoot. Flexible orthotics, which include specific support for the anterior metatarsal arch are particularly important in this condition, since they decrease the shearing stresses on the forefoot.

References

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