

## Flexible flatfoot treatment in children with mechanical sound vibration therapy

Raoul Saggini<sup>1</sup>, Francesco Speciale<sup>2</sup>, Giuseppina Rizzo<sup>2</sup>, Rosa Grazia Bellomo<sup>3</sup>, Giampiero Speranza<sup>2</sup>, Debora Di Mauro<sup>2</sup>

<sup>1</sup> Dipartimento di Neuroscienze e Imaging, Università degli Studi "G. d'Annunzio", Chieti-Pescara

<sup>2</sup> Dipartimento di Biomorfologia e Biotecnologie, Università di Messina

<sup>3</sup> Dipartimento di Scienze del movimento Umano, Università degli Studi "G. d'Annunzio", Chieti-Pescara

Flatfoot is a common syndrome with multiple etiopathogenesis, that have long been associated with pain and disability, and very often worries parents for their children's health and mobility.

The generic term "flatfoot" describe any condition in which the longitudinal foot arch is abnormally low or absent usually associated with heel eversion and talar prominence.

It is accepted that flatfeet are of different types. The most important classification considers two types, physiological flat foot and pathological flatfoot, with different prevalence and etiology. Although, many authors suggest that physiological flexible flatfoot usually does not cause disability and that asymptomatic children should not be burdened with inserts, a considerable number of arch supports are prescribed unnecessarily. An interesting and suggestive way to treat flatfoot with a conservative solution is to reduce structural alterations and symptoms increasing somatosensory input. The aim of the study was to improve the plantar arch proprioception information and muscles' tone using high focal vibration therapy (300Hz). Recently, it was observed the possible involvement of the nervous system in modifications of muscle performance induced by vibration.

In this study we evaluated the effects of high frequency vibrations applied on the skin of the feet in children affected by flexible flatfoot. Our data, obtained during quiet standing and during walking showed a significant reduction of Loading Surface of the Feet so we can affirm that VISS therapy may remit flexible flatfoot hypothesizing that postural control would improve after this treatment since somatosensory input from the lower limb has long been recognized as an important source of sensory information in controlling standing balance. Moreover, after vibratory stimulation of the mechanoreceptor on skin of the foot, we observed a significant increase in the strength of the muscles involved in maintaining posture and gait cycle. This makes us assume that these cutaneous receptors are specialized assuming, in addition to the classic role of exteroceptors, also the function of proprioceptors.