

## Work-related upper limb disorders: Can prevention and management be improved?

Sir,

Work-related upper limb disorders remain a challenge to the clinician because an estimated 75% are regarded as diagnostically unclassifiable.<sup>[1]</sup> Evidence-based prevention and treatment of these frequent and disabling disorders have therefore been limited and largely unsuccessful. It is essential to identify the involved tissues and structures as well as the responsible pathologies. To do so would require improved diagnostic approaches.

Upper limb pain appears frequently as neuropathic and may be accompanied by weakness/heaviness, tactile dysfunction and/or sensory abnormalities, e.g. paraesthesia. Although this combination of symptoms suggests a peripheral nerve-involvement, clinicians and researchers tend to attribute most pathology to muscles and tendons/insertions. Even when peripheral nerve-involvement is alleged, the focus is mostly restricted to carpal tunnel syndrome and cervical radiculopathy. The intermediate nerve receives less attention.

Rather specific neurological patterns follow focal neuropathies: Weakness in muscles innervated distally to the lesion, altered sensibility in supplied cutaneous territories and abnormal nerve trunk soreness. All physicians have been trained in an examination based on these principles. Still, a thorough neurological examination is rarely applied – in particular with respect to the more proximal portions of the upper limb nerves. It may be regarded as difficult and time consuming,

and the validity may be questioned if peripheral neuropathy is not proved by electrophysiology. Although electrophysiological studies are viewed as “golden standard” for peripheral neuropathy, a mixed and partial nerve affliction with few myelinated fibers intact and re-innervation taking place may result in entirely normal findings.<sup>[2]</sup>

A feasible physical examination should target the nerves from the roots to the muscular and cutaneous supply by including neurological items representative to neuropathies with various locations. It should be reproducible and preferably identify and exclude abnormalities in symptomatic and healthy subjects, respectively.

Our team has developed a detailed but still rapid semi-quantitative upper limb neurological examination comprising an assessment of the strength in selected individual muscles,<sup>[3]</sup> of sensory deviations from normal in homonymously innervated territories, and of the presence of mechanical nerve trunk allodynia.<sup>[4]</sup> Patterns of findings in accordance with the topography of the nerves and their muscular and sensory innervation were frequent – and also identified in patients that could not be diagnosed by conventional means. The patterns were reliably identified<sup>[4]</sup> and related to symptoms.<sup>[5]</sup> The infraclavicular brachial plexus was the dominant location and often combined with median and radial nerve-involvement at elbow level. Whether diagnosed by conventional diagnostic criteria or criteria developed by the authors, neuropathic upper limb disorders were also common among patients in general practice.

This low-tech examination demands no equipment beside a needle and a 256 Hz tuning fork. The manual assessment of individual muscle strength is easily learned by any physician.<sup>[3]</sup> The manual character of the examination indicates its feasibility by medical practitioners in any setting in industrialized countries as well as in the developing world.

Therefore, the developed and validated diagnostic approach may eventually constitute a step towards improved prevention and treatment of work-related upper limb disorders.

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