CASE REPORT

Upper limb disorder due to manual pipetting

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This case report describes the occurrence of non-specific upper limb symptoms, in a 47-year-old female scientific officer, associated with manual pipetting. The discussion considers the difficulty of risk assessment and reduction for this common procedure.

Key words: Non-specific upper limb disorder; pipetting.

INTRODUCTION

The existence of a relationship between occupational activity and non-specific upper limb disorder (i.e., cases in which there is an absence of physical signs) is disputed. However, pinch and grasp actions generate static forces, sometimes of large magnitude, in the thumb and such movements are requisite for manual pipetting. We report a case in which there appeared to be a relationship between manual pipetting and non-specific upper limb symptoms.

CASE REPORT

A 47-year-old right-handed female scientific officer in a teaching hospital research laboratory was referred to the occupational health department by her manager because she had developed wrist pain which was thought to be work-related.

There was a 1-year history of pain along the ulnar border of the right hand radiating to the wrist and distal forearm. Initially the pain occurred only while pipetting, but over the ensuing 6 months symptoms had worsened. There was pain over the medial aspect of the right elbow and she was being woken from sleep by pain. She had noticed difficulty with certain activities at home such as peeling potatoes, and she was sometimes using her left hand in preference. There was no history of trauma to the affected limb and her past medical history was unremarkable. Her mother had rheumatoid arthritis. She had been in this post for 5 years before the onset of symptoms and only this current job had involved any task requiring fine repetitive movements of the fingers; she had worked as a part-time dental assistant for 10 years previously.

The pipetting operation was performed with a Hamilton syringe. The operation required flexion at the interphalangeal joint of the right thumb, applying pressure onto the pipette button, with the metacarpophalangeal joint held static at 10°-15° of flexion (Figure 1).

Pipetting operations were conducted in sets, the runs lasting 2 days at a time. During these runs the pipetting action would be conducted approximately 700 times per hour. Typically there were two such runs per month although the number was higher at the time of onset of symptoms.

On physical examination there was a full range of movement at all joints of the upper limbs, with full power in all muscle groups and no neurological deficit. There was slight tenderness over the right medial epicondyle. Radiographs of hands and wrist were normal. A workplace visit was undertaken with the health and safety officer and laboratory manager. It was agreed that she cease manual pipetting work immediately. The diagnosis was a work-related upper limb disorder with an associated medial epicondylitis.

An electronic pipetting system was purchased and commissioned within three months. Resolution of her symptoms occurred such that four months later the only reported symptom was mild discomfort over the ulnar border of the right wrist when using a keyboard.

DISCUSSION

A literature search revealed only one report of upper limb pain related to pipetting, but in that case the
worker had osteoarthritis of the thumb interphalangeal joint. It is possible that such conditions are more common than generally reported and present to the GP, rather than the occupational physician. A recent study of the biomechanics of the thumb in pipetting illustrated that the activity has inherent ergonomic problems. It was proposed that pipette design should allow good fit for different hand sizes and that the button resistance be as low as possible.

Manual pipetting seems to be a hazard but estimation of the risk is difficult. Pipetting operations are common in laboratories and the number of people exposed may be large. The avoidance or substitution of the task is particularly problematic in highly specialized investigations using very small sample volumes. Satisfactory alternative electronic devices may not exist for these procedures and the small number of staff involved limits options for task rotation.

REFERENCES