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## Muscle imbalance

Alan Chamberlain, Wendy Munro and Alec Rickard

### INTRODUCTION

The concept of muscle imbalance (and balance) is not new. This is evidenced through over 60 years of texts involving muscle testing and function (Kendall et al. 2005) and has evolved over the most recent of those years through work from the likes of Janda (1983), Sahrmann (1987), Richardson (1992), Jull et al. (1999) and others. Clearly, alterations in muscle balance cannot be considered in isolation, but must be considered as part of movement control, where the differentiation of the factors leading to movement dysfunction is essential and part of the holistic assessment and management of individuals with musculoskeletal pain.

This chapter concentrates on the adaptation of muscle in relation to posture and movement patterns, and the relationship to musculoskeletal pain syndromes. The following knowledge and understanding of the reader will be assumed:

- the micro- and macro-anatomical structure and physiology of muscle and associated tissue;
- micro- and macrostructure related to function;
- macro-anatomy or gross anatomy of muscles and muscle groups, along with their relationships to each other and other tissue structures, such as bones, joints, connective tissue, viscera, neural and vascular tissue; in other words, what lies deep, superficial, superior, inferior, medial and lateral to the structure being considered.

In order to contain this subject within the limits of a manageable chapter, only the more commonly affected – and/or those deemed clinically important – muscle groups will be discussed, utilising select key clinical examples. However, the principles described in this chapter should be transferrable to any region in the body. In addition, when considering cause, effect and recovery, the Specific

Adaptation to Imposed Demand (SAID) principle should be applied, as originally proposed by Selye (1951). Example case scenarios will be illustrated using the subjective, objective, analysis, plan and evaluation (SOAPE) process, familiar to physiotherapists from a plethora of texts and institutions (Baxter 2003).



#### Clinical note

The assessment of muscle *imbalance* and management of musculoskeletal disorders with muscle *balance* techniques is just *one* approach amongst the plethora of physiotherapeutic assessment and management skills. It can be described as a method to rehabilitate patients presenting with movement dysfunction and its associated problems. Analysis of the subjective and objective assessment of the patient is key to identifying this as an appropriate modality for rehabilitation through hypothesis testing, clinical and critical reasoning, and evaluation of practice.

### What is muscle imbalance?

As physiotherapists, we need to be able to differentiate between what is considered a ‘normal’ (or ‘expected’) range of motion (ROM) and that which is deemed ‘abnormal’ – either hypo- or hypermobility – along with which structures may produce or restrict the range of motion. It must be noted that there may also be an underlying predisposition – or *pathology* – for hypo-/hypermobility, as in the case of connective tissue conditions, such as ankylosing spondylitis and hypermobility syndrome (see Figure 14.1) (as distinct from a joint demonstrating hypermobility), or neurological conditions, such as multiple sclerosis. However, it is outwith the scope of this chapter to discuss these specific pathological causes.