Editorial

The deconditioning paradigm for chronic low back pain unmasked?

For decades, the deconditioning process has been held responsible for the development and persistence of low back pain associated disability. It was hypothesized that, due to chronic low back pain (CLBP), patients diminish normal activities (also called disuse) and develop, besides societal and emotional problems, physical deconditioning signs such as loss of muscle strength and endurance as well as reduced aerobic capacity (Mayer and Gatchel, 1988; Verbunt et al., 2003). These physical consequences were thought to result in higher vulnerability and, eventually, more pain. Many health care providers adhere to this deconditioning paradigm when choosing physical training elements to improve physical fitness and performance in patients with CLBP (Jette and Jette, 1996; Daykin and Richardson, 2004). No convincing proof, however, for this physical deconditioning theory exists (Smeets et al., 2006a). Cross-sectional studies only have examined loss of aerobic capacity due to persistent pain, with contradictory results. Studies on loss of muscle strength or endurance of low back muscles have been similarly inconclusive. We therefore definitely need more, and especially longitudinal studies, to enlarge our knowledge on this topic.

In this issue of Pain, Bousema et al., 2007, report the results of a very appealing longitudinal study of patients measured at 4–7 weeks after onset of back pain and 1 year later. To our knowledge, this is the first paper in which patients with sub-acute low back pain have been followed over the course of a year to determine if deconditioning is indeed a result of chronic pain.

The authors should be lauded for their innovative attempt to increase our insight into the development of physical deconditioning and especially, into the change of the total activity level. Bousema et al. assessed indicators of physical deconditioning: body mass, body fat and muscle strength. The level of physical activity in the preceding year (h-PAL), and the perceived physical activity decline since the onset of back pain (PAD) were assessed by questionnaires. A triaxial accelerometer was used to calculate the amount of real life activity during 7 days, defined as the total counts of body movements during waking hours (PAL). After 1 year, those patients with chronic persisting pain showed no signs of physical deconditioning at all. Even more unexpected, PAL increased over 1 year in the group of patients with and those without chronic pain. Only in a subgroup of patients with chronic pain, a decrease in PAL was found. Negative affect and PAD during the 4–7 weeks of pain predicted decreased PAL 1 year later. However, this subgroup, compared to those with an increase of PAL despite persisting pain, did not differ on the level of pain and disability at baseline and follow-up. Furthermore, the authors pose a very interesting hypothesis that a subgroup of patients cope with their pain by using endurance strategies and overload their body (overuse). This phenomenon was recently proven to exist in a subgroup of patients after lumbar disc surgery (Hasenbring et al., 2006) and matches clinical experience.

From this longitudinal study we could conclude there is no evidence for the deconditioning paradigm. Before abandoning this concept, however, a few methodological remarks on this study should be made.

(1) More than 25% of the patients were recruited by advertisement and did not visit their general practitioner for their subacute pain. Furthermore, it is not clear how many, and what kind of treatment the selected patients received during the 1 year follow-up. Treatment might have prevented deconditioning and resulted in higher activity levels, especially since the CLBP patients reported less pain and disability at follow-up.

(2) Accurate measurement of physical activity levels in the past (PAD) or in the present (PAL) remains problematic, not just in this study. Recall bias may distort PAD and although physical activity levels (PAL) measured through accelerometers seem valid, patients might behave differently (be more active) just by wearing one. Aberrant movement due to pain may register as increased counts of movements and thus increased physical activity.

For the same reason the validity of the classification of two (increase/decrease) PAL-groups can be
questioned. Furthermore, no data are available on the natural variation of the PAL measured by accelerometry and hence the chosen cut-off point might be inaccurate.

This study included patients with sub-acute pain. A future study should include patients with acute pain, especially since this study shows that PAD predicts a lower level of activity 1 year later. Such a study could also be used to validate the PAD-concept: real decline of activities or only perceived decline?

For future research, more sophisticated research tools, yet to be developed, are mandatory to better document not only the total activity level, but also type of activity and activity pattern (Bussmann and Stam, 1998).

(3) The authors measured the level of physical fitness of patients by body weight, percentage of body fat and muscle strength, but unfortunately not aerobic capacity, which is the gold standard for cardiovascular fitness. The absence of change in all variables might indicate that no deconditioning took place or that the wrong variables were used to assess physical fitness. For future research it might also be interesting to study more specific deconditioning signs, e.g., neuromuscular changes (Barker et al., 2004) or fibre changes of deep lumbar muscles (Crossman et al., 2004).

Finally, it should be kept in mind that there is sufficient evidence that physical treatment is effective (Hayden et al., 2005). However, there is increasing evidence that reconditioning itself is not the mediating process, but the reduction of pain related fear and pain catastrophizing (Mannion et al., 1999; Smeets et al., 2006b).

Nevertheless, this study, incorporating activity level parameters, is the first of promising future research regarding the role of activity level and pattern in chronic low back pain, preferably by using longitudinal designs starting at the onset of pain.

References


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