To treat or not to treat postpartum pelvic girdle pain with stabilizing exercises?

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Abstract

Women with pelvic girdle pain (PGP) often consult physical therapists for help and are treated with different therapies without firm evidence for the effectiveness. Two randomized controlled trials have investigated the effect of stabilizing exercises for PGP. The most recent study demonstrated significant positive results in favour of exercises (Stuge et al. The efficacy of a treatment program focusing on specific stabilizing exercises for pelvic girdle pain after pregnancy. A randomized controlled trial. Spine 2004a;29(10):351–9), the other did not (Mens et al. Diagonal trunk muscle exercises in peripartum pelvic pain: a randomized clinical trial. Phys. Ther. 2000;80(12):1164–73). Consequently, the two studies provide contradictory advice for treatment of PGP. The question is thus, whether stabilizing exercises should be recommended as treatment for PGP. Both the studies are of high methodological quality and are comparable with regard to subjects studied. However, there are several differences in the interventions and these are explored and discussed for better understanding of the conflicting results. Exercises that focused on only global muscles showed no effect. However, these exercises were not individualized and they were instructed by videotape. In the more recent study, exercises that initially focused on local muscles, and then gradually added global muscles showed a significant, positive effect. Exercises in that study were supervised, corrected, individualized concerning choice of exercises, order and dosage, and pain was avoided. This comparison indicates that effective treatment of postpartum PGP may be achieved when exercises for the entire spinal musculature are included, individually guided and adapted to each individual.

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1. To treat or not to treat postpartum pelvic girdle pain with exercises?

Women with pelvic girdle pain (PGP) often consult physical therapists for help. They are provided with various forms of treatment; however, these different therapies have been without firm evidence of their effectiveness (Mens et al., 1996). A systematic review revealed that few clinical trials have evaluated the effectiveness of physical therapy for pregnancy-related low back pain (LBP) and PGP (Stuge et al., 2003).

Because of heterogeneity and the varying quality of the studies, no strong evidence exists concerning the effect of treatment for PGP. Postpartum PGP represents a significant challenge to therapists, yet only 2 randomized controlled trials have investigated the effect of exercises in the treatment of postpartum PGP (Mens et al., 2000; Stuge et al., 2004a).

Mens et al. (2000) investigated the effect of diagonal trunk muscle exercises ($n = 16$) compared with training of the longitudinal trunk muscle system ($n = 14$) and no exercises ($n = 14$). The subjects performed the exercises at home, instructed by videotape. Comparison between the groups at the end of 8 weeks’ intervention, revealed no significant differences. In a more recent clinical
study, we compared the effect of stabilizing exercises \((n = 40)\) with no specific exercises \((n = 41)\) (Stuge et al., 2004a). Both groups had on average 11 treatments during the intervention period of 20 weeks. The results demonstrated that women with an individualized treatment approach focusing on specific stabilizing exercises experienced significantly lower pain intensity, lower disability and higher quality of life than did women with individualized physical therapy without specific stabilizing exercises. These results were found after 20 weeks, and the effect was maintained 1 and 2 years postpartum (Stuge et al., 2004a, b).

The inclusion criteria—age, parity, duration of complaints, time since delivery, baseline pain intensity and the posterior pelvic pain provocation test scores—were similar in the two studies, making the studies comparable (Mens et al., 2000; Stuge et al., 2004a). Both studies were of high methodological quality as assessed by internal validity (Clarke & Oxman, 1999). However, the results of the two studies provide contradictory evidence regarding advice for treatment of PGP. The question is thus whether stabilizing exercises should be recommended as treatment for PGP.

When attempting to answer this question, it is necessary to understand the differences between the two studies. One obvious possibility for the different results may be that the rather low number of subjects in the study by Mens et al. (2000) is too small to detect significant differences between the groups. However, differences regarding the interventions employed in the two studies may also contribute to the inconsistent results. The aim of this paper is thus to explore and discuss elements of the two intervention strategies and their theoretical rationale. By this we hope to provide a better foundation for understanding the conflicting results, and also to highlight important principles for treatment for PGP.

1.1. Theoretical models for the treatment programs

It has been suggested that PGP is related to insufficient stability of the lumbopelvic region. The exercises in the study by Mens et al. (2000) were based on a theoretical model of sacroiliac (SIJ) function, the self-locking mechanism. According to that model, stability is obtained by a combination of form and force closure (Vleeming et al., 1997). It is thought that SIJ shear may be prevented by friction (form closure), and dynamically influenced by muscle force and the integrity of facial structures and ligament tension (force closure).

The treatment program in our study (Stuge et al., 2004a, b) was founded on the theories of an integrated model for lumbopelvic function and stability (Lee & Vleeming, 2000). This model is an expansion of the self-locking model and is comprised of four components (form closure, force closure, motor control, emotions and awareness). Bergmark (1989) described two functional muscle systems linked to spinal stabilization as the deep local and the larger torque-producing global muscle systems. During recent years, there has been increased focus on the local muscle system, including musculus transversus abdominis (TrA), obliquus internus, multifidus, pelvic floor and the diaphragm. TrA is said to play an important role in stabilizing the lumbar column and the pelvis (Hodges & Richardson, 1996; Richardson et al., 1999, 2002). Functional stabilization of the pelvic girdle was expected to require both local and global muscles appropriately timed and co-ordinated through efficient motor control. Muscles regarded as being significant in the stability of the lumbopelvic region are illustrated in Fig. 1.

1.2. The exercise interventions

Mens et al. (2000) believed that training of the diagonal trunk muscle systems (gluteus maximus and the contralateral latissimus dorsi, and the oblique abdominals) would increase stability and benefit women with PGP, partly by increasing muscle force and endurance. The subjects received a 30-min videotape in which explanations were given about the possible cause of PGP, prognosis, ergonomic advice, and information on how to use a pelvic belt and instructions on how to train the diagonal trunk muscle system by two different exercises. Light exercises to improve muscular awareness were to be performed 3 times a day and heavy exercises 3 times a week. The subjects were to gradually increase the number of repetitions per series, guided by their pain and fatigue.
Our treatment program (Stuge et al., 2004a) focused on stabilizing exercises for specific activation of the local and the global muscle system, with attention on motor control to coordinate muscle recruitment. An individual treatment plan was made based on the clinical findings. The focus in the initial stage of the treatment program was to train specific contractions of the deep muscle system, independently from the superficial muscles. This focus was combined with information, ergonomic advice, body awareness training, relaxation of global muscles, and mobilization, depending on the clinical findings. When asymmetric motion of the SIJs was noticed, joint mobilization was executed to optimize form closure, either performed by the therapist with simple techniques of oscillation between ilium and sacrum or by self-mobilizing using a muscle energy technique (DonTigny, 1997).

When low force contractions of the transversely oriented abdominal muscles were achieved, exercises for the global muscles were gradually added to the program. The importance of activating the local muscles before adding the global muscles was stressed during all exercises and daily activities. The difference between stability and rigidity (inflexibility, stiffness) was emphasized to the patients. Rigidity was considered unfavourable. Specific exercises for each patient were taken out of a fixed menu of exercises (examples given in Fig. 2). The goal was to execute 3 sets of 10 repetitions of each exercise 3 days a week. The number of exercises and repetitions was determined by the quality of the execution of the exercise. The exercises should not trigger a trembling of the lumbosacral region or provoke pain, either during the exercise program or at any time afterwards. However, the patients were encouraged to feel the difference between pain and muscle soreness, the latter was considered positive.

Women with PGP often experience pain while bearing weight, which is unavoidable when caring for new-borns. Hence, the sling exercise apparatus TerapiMaster (Ljunggren et al., 1997) was chosen to carry out most of the exercises. By using the TerapiMaster it is easy to down- and up-grade the exercises to an individual level of load. It was expected that the systematic increase of lever arms together with a training diary would be motivational in achieving adherence to the exercise program. To allow the exercise program to be

Fig. 2. Examples of exercises used in the treatment program.
performed mainly at home, the subjects borrowed the sling exercise equipment during the intervention period.

2. Discussion

2.1. Exercises for local and global muscles

In contrast to the study by Mens et al. (2000), the focus in the initial stage of our treatment program (Stuge et al., 2004a) was to specifically train contractions of the deep muscle system, independently of the superficial muscles. Deep local muscles are thought to provide the fine-tuning of the intersegmental motion as a component of the complex interdependent activity of the trunk muscles to stabilize the lumbopelvic region (Hodges & Moseley, 2003). The TrA and the pelvic floor muscles are found to stiffen and hence possibly stabilize the female SIJ (Richardson et al., 2002; Pool-Goudzwaard et al., 2004). The deep muscles provide control of intersegmental motion that is not specific to the direction of force, whereas the superficial muscles control the orientation of the spine (Moseley et al., 2002). Because probably all trunk muscles are required for lumbopelvic control and functional stability of the spine, global muscles were gradually added to the exercise program (Hodges & Moseley, 2003). A significant increase in SIJ stiffness has been demonstrated by contracting global muscles such as erector spinae, biceps femoris, gluteus maximus and latissimus dorsi (van Wingerden et al., 2004). Functional stability depends on the relative activation of all trunk muscles and the relative contribution of a given muscle to spine stability has been shown to depend significantly on loading magnitude and direction (Cholewicki and VanVliet, 2002; Kavcic et al., 2004).

No consensus, however, exists on effects of altered muscle recruitment patterns (Cholewicki et al., 2003; Hodges & Moseley, 2003; van Dieen et al., 2003). Nonetheless, interventions, such as those used in our study (Stuge et al., 2004a), focusing on reorganisation of the control of the deep and superficial trunk muscles through motor learning strategies have shown reduced pain and disability, and reduced recurrence of pain in LBP patients (O’Sullivan et al., 1997; Hides et al., 2001). To activate the local muscle system may thus be a necessary first stage of rehabilitation, before more generalized exercising (Hides et al., 1996; Jull et al., 1998). This may have been a missing element in conventional exercise programs, as it was in the study by Mens et al. (2000).

2.2. Performance of exercises

Avoiding pain provocation and maintaining lumbo-pelvic control was considered important when choosing and carrying out the exercises in our study (Stuge et al., 2004a). Clinical experience indicates that exercises which specifically activate the hamstrings often provoke pain: such exercises were therefore not included in our program. In subjects with pain related to the SIJ region, a delayed onset of activity of obliques internus, multifidus and gluteus maximus has been demonstrated by means of electromyography (Hungerford et al., 2003). Delayed activation of gluteus maximus may alter compression of the SIJ (Barker et al., 2004), with a subsequent failure of the mechanism required for optimal load transfer through the pelvis. As reported by Hungerford et al. (2003), biceps femoris activation occurred earlier on the symptomatic side. It was speculated that the early onset of the biceps femoris activation occurred to assist hip extension because of delayed onset of gluteus maximus activity, or to augment force closure across the SIJ via connections of biceps femoris to the sacrotuberous ligament (Hungerford et al., 2003). Early biceps femoris activation may have occurred in a hip extension exercise used in the study by Mens et al. (2000), and may be one reason why pain was provoked in 25% of the exercise group. The authors of that study suggest that training of hip extension may worsen PGP. However, hip extension should be trained with a dominance of gluteus maximus activity to avoid pain and possibly increase stability of the lumbopelvic region.

In our study (Stuge et al., 2004a) co-contraction exercises were mainly directed to the local muscles. Hyperactivity of global muscles was unwanted. Compensatory activity of the global muscle system is reported to occur in the presence of local muscle system dysfunctions (Hodges, 2003). This is claimed to be the neural control system’s attempt to maintain the stability demands of the spine in the presence of local muscle dysfunction (Richardson et al., 1999). A compensatory pattern with hyperactive muscles giving too much compression or muscle imbalance may cause pain and reduce mobility in the SIJ. It is likely that exercises may provoke pain if a compensatory pattern is sustained during training. According to Hodges and Moseley (2003) a strategy with increased stiffening of the spine by activation of the large superficial muscles may compromise optimal lumbopelvic function with excessive compressive loading to spinal structures. In people with low back pain, electromyography studies show sustained activity of the erector spinae at the end range of spinal flexion (Shirado et al., 1995). If these observations are applicable for PGP patients, hyperactivity of the extensor muscles is possible because of pain or fear of pain (Hodges & Moseley, 2003). In the study by Stuge et al. (2004a), therefore, intermittent relaxation of the extensor muscles was considered to be just as important as optimal contraction of these muscles to avoid “splinting” the lumbosacral region. It is possible that
the participants in the study by Mens et al. (2000) constantly contracted the back extensor muscles during the leg and arm extension exercise and thereby provoked pain. It is also possible that a lack of specific activation of local muscles while exercising reduced lumbopelvic control and provoked pain in that study.

Quite often, patients experience a flare-up of pain during exercising (Moseley, 2003). This may be because of an unfavourable performance of the exercises, or because of too high a dosage. According to Moseley (2003) increasing the exercise load too fast is a common reason for failure in the management of exercise programs. To balance progression with avoidance of flare-ups we used an exercise diary to document the progression. The importance of a systematic approach to identification and progression of level of physical exercises and daily activities should not be underestimated and it has probably influenced the results of our study (Stuge et al., 2004a). Also, supervision of exercises is critically important in improving quality of exercise performance. A strong correlation between the quality of exercise performance and decrease in pain has been found (Friedrich et al., 1996). Supervision and regular follow-up enable the therapist to adjust a program according to the patients’ progress and might contribute to the maintenance of exercise benefits (Middleton, 2004). The women in our study (Stuge et al., 2004a) reported that reasons for the high compliance were the possibility of exercising at home and the care given. Information and advice were also given in the study by Mens et al. (2000); however, it was given by a videotape in a standardized manner. Thus, the possibility for the patients to benefit from a patient–therapist relationship was hindered. It is possible that both pain and fear of pain may lead to changes in motor control (Hodges and Moseley, 2003). The avoidance of provoking pain and encouraging the women to get the feeling of control of their body probably also reduced possible fear of physical activity.

2.5. Compliance

Compliance is essential for proper interpretation of the effect of an exercise intervention. To exercise 3 times a week, which is considered optimal (Kraemer et al., 2002), can be hard to achieve for women with a newborn child. Clinical experience shows that for these patients it is a challenge to get continuity in an outpatient exercise program. In our study (Stuge et al., 2004a) the subjects reported to have accomplished on average 80% (CI 74, 86) of exercising 3 times a week for 15–20 weeks. This compliance was surprisingly high (Sluijs et al., 1993; Ostgaard et al., 1997; Mens et al., 2000; Middleton, 2004). The women in our study (Stuge et al., 2004a) reported that reasons for the high compliance were the possibility of exercising at home and the guidance by the therapist. Also, the fact that exercising did not provoke pain probably influenced compliance. In the study by Mens et al. (2000) 25% in the exercise group stopped exercising because of pain provoked by the exercises, which is known to contribute to low compliance (Linton et al., 1996). Additionally, in our study (Stuge et al., 2004a), the experience of continual improvement made visible by the exercise diary probably contributed to the high compliance. It was also emphasized that the patients should understand why, not just what to do, to facilitate empowerment and commitment to change (Lively, 2002; Liddle et al., 2004).

3. Conclusion

Despite conflicting evidence we recommend treating postpartum PGP with stabilizing exercises. However, exercises for enhancing lumbopelvic control and
stability should involve the entire spinal musculature. Focusing on only global muscles, and without individual guidance, seems insufficient. The individualized and supervised treatment program focusing on the local system with gradual addition of exercises for the global system showed better results, and a high compliance. Further studies are needed to examine the importance of the different aspects of the interventions, such as choice, order and dosage of exercises, supervision and compliance.

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References


