Taping and Bracing of the Knee Joint: A Ladder of Conservative Intervention for Patellofemoral Pain

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Title

Taping and bracing of the knee joint: A ladder of conservative intervention for patellofemoral pain.

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(WC Max= 500 words: Currently 495)

Background

Over the last 30 years there has been considerable interest in different conservative treatments for patellofemoral pain. Although a consensus has emerged that low cost treatments such as taping and bracing are effective at relieving pain, there has been an ongoing debate about whether these effects are mediated by enhancing proprioceptive mechanisms. In addition few papers have been published comparing the biomechanical effects of such interventions on knee varus/valgus and internal/external control in normal subjects or subjects who suffer from knee pain and instability.

Purpose

The purpose of this work was to explore the biomechanical effects of taping and bracing in healthy individuals and people with patellofemoral pain, and to determine if a “ladder of effectiveness” exists with the different interventions.

Methods

Twenty-four patients with patellofemoral pain and thirty-nine healthy individuals were asked to perform a slow step down task. This was conducted under a range of randomised conditions including: (a) no intervention, (b) neutral patella taping, (c) tubigrip, (d) patellofemoral web brace with patellar stabilization and (e) a silicone reinforced compression sleeve. In all cases three dimensional movement and moments at the knee were collected using a ten camera infra-red Qualisys motion analysis system and two AMTI force platforms. Reflective markers were placed on the foot, shank and thigh using the Calibrated Anatomical Systems Technique.

Results

An independent samples t-test showed that the patients had a significantly greater knee varus/valgus range of motion than the healthy individuals, 9.5 and 6.5 degrees respectively (p<0.01) with no intervention. A mixed methods ANOVA identified changes in the knee varus/valgus and internal/external range of motion between the interventions, p=0.03 and p=0.01 respectively. The brace with patellar stabilization reduced knee varus/valgus and internal/external range of motion by 2.8 degrees (p<0.01), followed by the textured neoprene sleeve and tubigrip which reduced the knee varus/valgus range of motion by 2.7 degrees (p<0.05), with the neutral taping showing a 1.3 degree reduction in the patient group only (p<0.05). No differences were seen in peak knee flexion. At the end of the test the participants were asked to place the conditions in a rank order of which they thought helped most with joint stability and pain. The most popular order was the web brace with patellar stabilization or silicone reinforced compression sleeve, neutral tape or tubigrip and then no intervention.
Conclusion
These changes in knee mechanics provide important evidence about the possible proprioceptive and mechanoreceptive effects of such treatments, and their role in the management of individuals with patellofemoral pain. This reinforces the view that varus/valgus and internal/external mechanics should not be overlooked when studying knee pain and instability.

Implications
This work provides evidence for a graduated ladder of intervention, from neutral taping which produced a small improvement in varus/valgus control, tubigrip and textured neoprene sleeves giving a further improvements varus/valgus control and bracing producing the greatest improvement in varus/valgus and internal/external control. These results fit well with participants’ perceptions of which they thought helped most with joint stability and pain level.

Key Words
Patellofemoral pain, knee instability, taping, bracing, proprioception, control.