Supportive Devices for Preventing and Treating Subluxation of the Shoulder After Stroke

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Background
Supportive devices such as slings, wheelchair attachments, and external shoulder orthoses have been used to treat subluxation of the shoulder after stroke. However, the efficacy of these devices has not been systematically investigated. The aim of this review was to investigate the effect of supportive devices (slings, wheelchair attachments, and external shoulder orthoses) in preventing subluxation, repositioning the head of the humerus in the glenoid fossa, decreasing pain, increasing function, and adversely increasing contracture in the shoulder after stroke.

Methods
We searched the Cochrane Stroke Group Trials Register (last searched on March 22, 2004). In addition, we searched the Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library, Issue 1, 2004), MEDLINE (1966 to March 2004), CINAHL (1982 to March 2004), EMBASE (1974 to March 2004), AMED (1985 to March 2004) and the Physiotherapy Evidence Database (PEDro, March 2004). We also hand-searched conference proceedings and contacted authors for additional information. Studies were included if they were: (1) randomized, quasi-randomized, or controlled trials; (2) participants had a clinical diagnosis of stroke; (3) intervention was the use of supportive devices; and (4) subluxation, pain, function, or contracture were measured as an outcome. Two independent reviewers examined the identified studies according to the inclusion criteria. Included studies were assessed for methodological quality and then categorized as either (1) supportive devices versus no supportive devices or (2) two supportive devices. Data were extracted and crosschecked.

Results
We identified 4 trials (142 participants) that met the inclusion criteria. One low-quality trial examined the use of a hemisling and reported that no participants had subluxation >10 mm after 2 to 3 weeks of wearing a hemisling versus not wearing one. Furthermore, the same number of participants in each group had lost >30° of shoulder external rotation (Peto odds ratio [OR]=1.00; 95% confidence interval [CI], 0.1 to 9.3) whereas more participants in the hemisling group had pain (Peto OR = 8.7; 95% CI, 1.1 to 67.1) than in the control group although the pain was slight. Two high-quality trials and one low-quality trial examined the use of strapping. Strapping the shoulder was effective in delaying the onset of pain (weighted mean difference [WMD]=14 days; 95% CI, 9.7 to 17.8), but was ineffective in reducing pain severity (WMD = -0.7 cm on a visual analogue scale; 95% CI, -2.0 to 0.7), increasing upper limb function (WMD=0.8; 95% CI, -1.5 to 3.1), or affecting the degree of contracture (WMD = -1.4 degrees; 95% CI, -10.9 to 8.1) at the shoulder.

Conclusions
There is insufficient evidence to conclude whether slings and wheelchair attachments prevent subluxation, decrease pain, increase function, or adversely increase contracture in the shoulder after stroke. There is some evidence that strapping the affected shoulder delays the onset of pain but does not decrease it. There is also some evidence that strapping does not increase function nor adversely increase contracture.

Implications for Practice
Given that there is insufficient evidence at present from randomized controlled trials to conclude whether supportive devices are effective in preventing subluxation of the shoulder after stroke, clinicians must use other forms of evidence. For example, examination of observational studies suggests that firm supportive devices (such as lap trays, arm troughs, and triangular slings) have the potential to prevent subluxation because they have an immediate effect in reducing subluxation in a shoulder that is already subluxed. In addi-
tion, because strapping the shoulder appears only to be effective in delaying the onset of, but not preventing, pain in the shoulder, and it has no effect on contracture or function, at this stage it is not recommended.

Implications for Research

We suggest that there is a need for randomized controlled trials to evaluate the efficacy of supportive devices in preventing subluxation and pain, in increasing arm function, and evaluating any adverse effect of increasing contracture early after stroke. Supportive devices should be applied to these individuals early, ie, as soon as they are allowed into the upright position, and continued for a period of time long enough for an effect to be detected, ie, 4 to 6 weeks. Outcome measures should include subluxation of the shoulder (mean and SD in mm as well as number of participants with >5 mm of subluxation), pain in the shoulder (mean and SD on a visual analogue scale), arm function, and contracture of the shoulder (mean and SD in degrees of shoulder external rotation as well as number of participants with >15° loss of shoulder external rotation).

Note: The full text of this review is available in the Cochrane Library (for subscribers: http://www3.interscience.wiley.com/cgi-bin/mrwhome/106568753/HOME). The full article should be cited as: Ada L, Foongchomcheay A, Canning CG. Supportive devices for preventing and treating subluxation of the shoulder after stroke. *Cochrane Database Syst Rev.* 2005, Issue 1.

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