



Summer 2012

Stretching our Minds about Stretching

This summarizes the presentation made at the PABC Forum on May 5th by Alison Hoens (MSc, BScPT, Physical Therapy Knowledge Broker), Ada Tang (PT PhD, Postdoctoral fellow, UBC Department of Physical Therapy), Sophia Sauter (MScPT, BPHE, Clinical Instructor, UBC Department of Physical Therapy; Clinic Owner), Deb Monkman, (MLS, BSc, PABC Clinical Librarian). It is a summary and take-home message of the evidence regarding the use of stretching in populations without injury, with musculoskeletal/orthopaedic injury, and with neurological conditions (slides are on the Knowledge Centre & Library on the members site).

General Concepts

- The term 'stretching' is used variably to describe static, dynamic, passive, active positions that are held for a spectrum of durations (brief eg. < 10 seconds to prolonged eg. 2-5 minutes and even up to several hours using specialized devices such as splints).
- The variability in the definition of the term 'stretch' helps to account for the challenges in finding evidence in the literature to support its effectiveness.

Healthy and/or non-injured and/or athletic population

Use of stretch prior to activity or performance Twenty years ago it was strongly encouraged, taught and practiced,

for normal individuals/athletes to stretch immediately prior to activity or competition. However, a plethora of research in the late 90's and early 2000's indicated that this was actually detrimental to performance (demonstrated reduced strength, muscle activity, endurance, jumping height and sprint times). Consequently the recommendation was NOT to stretch immediately prior to the event. But, just when we thought the direction from the literature was clear, there is now recent evidence to show that as long as the stretches are held less than 60 seconds each, maximal muscle strength is not decreased (Kay & Blazevitch, 2012).

Use of stretch to prevent injury

We used to tell recreational and competitive athletes that if they stretched they would be less prone to injury – but is this true? A recent Cochrane Review showed that there was no evidence that stretching reduces lower limb soft tissue injuries (Yeung, Yeung & Gillespie, 2011).

OOPS, guess that means that we can no longer laud that as the primary reason to stretch!

Use of stretch to prevent delayed onset muscle soreness A Cochrane Review by Herbert & de Noronha (2011) revealed that "stretching, whether conducted before, after, or before and after exercise,

does not produce clinically important reductions in DOMS in healthy adults".

Take-home messages

All this evidence culminated in the recent recommendation in the American Academy of Sports Medicine Guidelines (2011), that *only aerobic activity (and not stretches) be undertaken prior to activity*. In addition, it is recommended that when stretches are performed independent of activity that the following parameters be used: Frequency — at least 3 days/ week; Duration — hold stretch at least 10 seconds progressing to 30 seconds; and Repetitions should be 3-5 times per session. With respect to which type of stretch is best, it appears that dynamic stretching may be more effective but the selection of static, ballistic, PNF etc. should be based on matching it to the type of activity that will be undertaken by the individual and their own preference for type of stretch.

Orthopaedic/Musculoskeletal injury

Review of how stretching works

There are several theories to explain the effect of stretching: the lengthening effect it has on connective tissue (which is viscoelastic in nature), the addition of sarcomeres in the muscle unit, a neuromuscular relaxation effect, and/or an altered perception of the sensation of stretch (Weppeler 2010). According to a landmark article by Sapega in 1981, the best way to permanently

elongate connective tissue is to perform *prolonged, low intensity stretches at elevated tissue temperatures and then cool the tissue* before releasing the tension.

Stretching in the presence of acute hamstring injuries • A systematic review in 2012 by

Reunick examined the use of stretching in the acute hamstring strain population and found that there was a lack of high quality studies, but there was limited evidence to support the use of hamstring stretches, agility and trunk stability exercises.

- In 2008 a Cochrane review (Mason et al.) concluded that there was limited evidence to suggest that rate of recovery can be increased with daily hamstring stretching, but that consideration should also be given to the lumbar spine, sacroiliac and pelvis alignment, as well as postural control mechanisms when managing hamstring injuries.

Stretching in the presence of musculoskeletal contractures Katalinic et al. in a 2011 Cochrane Review found there was moderate to high quality evidence to indicate that stretching

(< 7 months) does not have clinically important immediate short-term or long- term effects *on joint mobility* in people with or at risk of contractures.

Is there a prescription for stretching in the injured musculoskeletal population? A specific prescription for stretching in the presence of injured tissue does not exist. It behooves clinicians to base their prescription on what evidence is available in the literature, in combination with their clinical experience and the patient's preference. For the injured musculoskeletal population, we can extrapolate from the ASCM Guidelines (see above) and warm the tissue prior to stretching by use of passive external heat or an active warm-up. We have limited evidence to suggest that stretching is effective in the treatment of acute hamstring strains in combination with other forms of treatment, but not effective in the prevention or treatment of contractures. The effectiveness of stretching for other specific orthopaedic populations is beyond the scope of this article. We can continue to confidently use stretching to correct muscle imbalances in healthy tissue, and as an adjunct to other treatment methods (based on the clinical population and the specific client's presentation) in injured tissue.

Neurological Conditions

Why stretch?

- In neurological populations, changes in ROM may occur directly from the condition, or may be a secondary consequence of reduced movement, activity and mobility.
- As such, we believe that our treatment programs should aim to improve, or at least prevent the loss of ROM, where we hope for payoff in improved function for our clients.
- Stretch may be self-applied, or applied manually (by therapist or caregiver), or mechanically (through positioning (e.g. in bed, wheelchair, standing frame, tilt table), splints, serial casting).

What's the evidence?

- A recently-published Cochrane review (Katalinic et al 2011) focused on the effectiveness of stretching on joint

mobility, spasticity and pain management within variety of neurological conditions (Charcot- Marie-Tooth disease, cerebral palsy, spinal cord injury, stroke and traumatic brain injury).

- Stretching had small (3° , 95% CI 0° - 5°), immediate effects on joint mobility, but there was no longer- term carryover, and no effects on pain, spasticity or activity limitation.

Take-home messages

Staying Up-To-Date with the Literature

How can you keep current with the ever- changing literature on stretching? To help you, we have created “one-click access” to a Hot Topic Alert on the members website. There you will find the latest citations and abstracts, with links to full-text articles, to assist you in your clinical practice. Visit the Knowledge Centre & Library regularly for all of our Hot Topic Alerts, along with instructions for setting up your own Alert, and stay ahead of the curve.

References: Contact librarian@bcphysio.org if you would like any of the articles cited.

- There is limited evidence on the effectiveness of stretching in neurological populations.
- This challenges our beliefs in why we stretch, why it's important for our clients, and whether or not it's as effective as we hope it to be.
- Currently, there is too much variability in the research protocols to determine an optimal program that will be effective.
- We cannot conclude that stretching outside of structured protocols (e.g. during daily routines) or that programs of longer duration (>7 months) are not effective.