ORTHOSPORTS

QUESTION FOR PHYSIOTHERAPISTS

Resistance Training and Major Shoulder Pathology:

Overview: The popularity of physical training has increased significantly over the last 15 years. The 1990's saw an increase in the number of gyms and gym franchises with numbers almost tripling in most Western countries. There is also a change in what gyms offer. More resistance training (RT) is available as well as a diverse range of organised training including circuit classes, pilates, yoga, combat classes, stretching and so on. Concurrently the gym membership profile has altered with a significant increase in the number of over 50 year olds attending. This group invariably participates in RT, comprising an increasing portion of the over 50 million Americans who regularly participate in RT.

Very little is known about the effect of RT with major shoulder pathology. The pathologies to be addressed are rotator cuff disease (in over 50's) and gleno-humeral instability (in under 40's).

What is resistance training?

Resistance training may be defined as any exercise that causes muscles to contract against an external resistance with the aim of increasing muscle strength, tone, mass and endurance. The external resistance may be one's own body weight or training devices such as weights and bands.

The health benefits of RT are clear and include an increased ability to perform daily activities, joint protection, improved bone strength, protection from cardiovascular disease, improved proprioception, psychological benefits and reduced risk of injury including tendinopathy. Many health groups, ranging from the National Heart Foundation to the American College of Sports Medicine, support these benefits.

It should also be noted that age-related sarcopenia (skeletal muscle atrophy) is now much better understood with studies showing reversibility in elderly patients. There is an ever-changing variety of programmes and lifting techniques. The training weight may vary from 50-100% of one repetition maximum (RM) with variable frequency. A basic RT approach with weights is summarised below:

Strength Program	Purpose	Example
Toning	Commencing Weights	2-3 sets of 10-15 reps
Endurance	Develop a Base	3-4 times / week to start
	Strength maintenance	Maintain at twice / week
Hypertrophy	Greater Power	4 sets of 6-8 reps
	Bulking Up	Alternate Days
	Appearance	'Split Programme'
		3 times/week/muscle group

Resistance Training and major shoulder pathology

The shoulder is highly susceptible to injury with RT, comprising 36% of new injuries. In addition the injury rate when testing with a 1RM is higher than any body area. In patients with major shoulder pathology, the injury risk occurs when a weight-bearing load is created through the shoulder girdle. The common positions where this occurs include bench press, shoulder press, military press, various push-up positions (including yoga) and dips. This is a greater problem with older patients suffering rotator cuff disease.

a) Rotator Cuff Disease. Most patients over 50 years with advancing rotator cuff weakness have associated tendinopathy. Weakness on manual testing in more than one plane is not uncommon following rotator cuff repair (even if the patient is symptom free). Studies have shown that the rotator cuff may remain fatty and degenerate following surgery. There are no published studies examining moderate weight RT following rotator cuff surgery. In patients who have undergone rotator cuff repair surgery, the outcomes of revision surgery (if the rotator cuff is re-torn) are worse. Movements such as forward and lateral raises may recreate impingement and tear the rotator cuff.

b) Gleno-humeral Joint Instability (GHJI). In patients aged 20-40 years GHJI often requires surgery. Open surgery frequently violates the subscapularis which remains at risk of re-injury. Revision surgery for recurrent instability is also less successful. GHJI often leads to secondary gleno-humeral osteo-arthritis, with articular cartilage changes often seen in young patients. It must be appreciated that allowing RT in the ABER position is common but anecdotally is a source for re-injury. Alternate exercises are recommended.

c) Biomechanics and safety. Increasing the weight-bearing load through the GHJ, especially in the ABER position, significantly increases the demand on the rotator cuff and increases shear forces through the capsulo-labral complex. Older patients and those who are technically untrained or deconditioned are at higher risk of injury. Alternatives for pectoral strengthening could include standing cable press, water based exercises or lowering the RT load using bands.

References:

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