Strapping, wrapping, taping and bracing.

Watching a rugby game is interesting. Not only is there a plethora of protective gear worn by the players, but also the number of players who have some part of their anatomy strapped or wrapped in some type of bandage or support is remarkable. There are probably fewer players on the field without some supportive or protective strapping than those who do manifest some form of protective strapping.

Thus if our patients make use of this practice, it behoves us to consider what it is all about and how best we may advise them. Strapping, wrapping, tape and braces do not come cheaply and if our patients use these frequently, we can benefit both their financial and physical health by offering sound advice.

What are we talking about?

- **Strapping or taping** indicates the binding with various widths of adhesive tape.
- **Wrapping** is the application of non-adhesive binding to achieve the support required.
- **Bracing** is the use of generic or custom made devices to provide support.

Here follows some information gleaned from referenced literature and thereafter follows some practical guidelines concerning these practises. The skill of strapping and taping requires practice and the specific techniques applicable to each joint will not be discussed.

When one has to strap a joint or injured area, either for prevention or therapy, we should:

- consider why we are doing it,
- what we want to achieve
- and the best way to achieve this.

What can we learn from the literature about these practises?

Most of the information comes from studies performed on ankles and knees.

Knees:

Knee bracing and strapping techniques are widely practised by rugby players but their results vary and there are mixed opinions over their usefulness[1]

Taping the patella to reduce pain associated with poor patellar alignment is considered effective. [1]

Specific supports can improve function and provide protection in patients with injuries e.g. ACL deficiency [2].

When applied, knee braces compress the soft tissues of the thigh and leg. External compression may abnormally elevate intramuscular pressure beneath the straps of the knee brace, decrease local muscle blood flow and muscular oxygenation, and induce premature muscle fatigue. Functional knee braces may give valuable support to athletes with unstable knees. They may also be a valuable rehabilitative tool in patients following surgery for knee joint instability. However, prophylactic and functional knee braces do not improve performance and may even inhibit performance in asymptomatic athletes. Athletes and coaches should be aware of the serious adverse effects of knee bracing.[8]

"On the negative side, the presence of a brace may slow an athlete's straight-ahead sprint speed and cause early fatigue to its wearer. This effect appears to vary from one brace to another according to its weight, design features, and pressure from the leg and thigh straps. However, it appears that knee braces do have the potential to restrict performance of the athlete for high-speed running but the effect is related to several factors. The weight of the brace resultant friction of the hinges, completeness of fit, and tightness of straps appear to be important. The most measurable effects include: increased muscular relaxation pressures; increased energy expenditure; and a related increase in blood lactate levels, maximal torque output, oxygen consumption and heart rate. On the other hand, experienced brace wearers and larger, stronger individuals displayed fewer, or no effects of donning a brace."[10]

Ankles:

A Cochrane based review concerning support for ankles[3] made the following report.

Reviewers' conclusions: This review provides good evidence for the beneficial effect of ankle supports in the form of semi-rigid orthoses or air-cast braces to prevent ankle sprain during high-risk sporting activities (e.g. soccer, basketball). Participants with a history of previous sprain can be advised that wearing such supports may reduce the risk of incurring a future sprain. However, any potential prophylactic effect should be balanced against the baseline risk of the activity, the supply and cost of the particular device, and for some, the possible or perceived loss of performance.

Participants with unstable ankles are helped by the use of external stabilising devices and these do not seem to affect sport specific abilities [4]. Taping also has a positive effect on joint stabilising via mechanical and proprioceptive and physiological processes. (neuro-muscular regeneration)[5,6].

Netball players can be confident that the biomechanics of their landing patterns will not be altered whether they choose to wear a brace or tape their ankle joints.[9]

The summary of the above is: that protective and supportive strapping taping and bracing is effective with very little effect on sportspecific performance. There are some potential drawbacks and side effects- but generally speaking the benefits far outweigh the detrimental side effects.

Let us now consider what we are trying to achieve.

The aim of wrapping, strapping, taping or binding is:

- The provision of support without restricting essential movement
- The restriction of undesirable potentially harmful motion with the allowing of desired motion.

The use may be

Therapeutic

- Compression to restrict swelling
- Support during the phase of weakness, reflex muscle spasm and muscle inhibition.
- Keep dressings in place

or

Preventative

- Injury risk decreased

Joints most suitable for strapping:

- Ankle
- Wrist
- Finger
- Acromioclavicular joint
- Metatarsophalangeal joint of the thumb

Joints where strapping is less successful:

- Shoulder
- Elbow
- Knee
- Spine

Hints, tips and considerations when applying adhesive tape:

- If the purpose is to restrict undesirable motion use adhesive non-stretch tape
- Adhesive tapes may cause irritation of the skin
- The skin should be hairless, clean and dry and free from oil
- Friar's balsam or tincture of Benz. Co improves adhesiveness but may itself produce irritation
- Apply anchors proximally and distally as tape adheres better to itself than skin.
- Maintain the joint in an overcorrected position whilst applying strapping
- The first straps should be applied parallel to the injured muscles fibres, tendons and ligaments
- Injured ligaments should be held in the shortened position during taping
- Where no previous ligament injury exists the ligament should be held in the neutral position.
- Unroll the tape before applying it to ensure correct tension.
- Apply even overall pressure.
- Overlap the previous tape by one half to ensure strength and even application.
- Firm support must be provided but constriction must be avoided. Check the circulation after applying the strapping.
- The strapping on the skin should be smooth and free of wrinkles.

How does it work?

- Mechanical support although the amount of time that this remains effective is uncertain- perhaps ±1 hr
- Proprioceptive benefits are retained longer and are more significant. This can help in reprogramming or retraining the neuromuscular mechanisms necessary for joint balance and stability.
- Psychological benefits. The tape can work as a psychological reminder so that the athlete consciously moderates lower limb loading behaviour.

Bracing

These are custom-made or generic appliances such as knee braces, ankle supports (e.g. aircasts) and elasticised supports

Advantages

Convenient
Cost effective after initial outlay
Less skill required in applying

Disadvantages

Slipping
Weight
Fitting
Wear and Tear
May be disallowed in some sporting codes

Practising the skills:

The best way to learn how to strap is to do it practically. Visit your local rugby club and offer your services. Help out at for e.g. the 'Dusi canoe marathon or any ultra marathon. Consider the points above.
What are you trying to do- prevention or therapy?
What structures are you trying to protect?
What undesirable movement do you want to restrict?
What technique will restrict this movement with the best results and the least side effects?

We are often too unsure to go ahead and get involved. First aid workers and various other helpers and coaches with little knowledge of Anatomy and Pathology often strap away with gay abandon. How much better could you not do this with a rational approach!

References:

1. Gerrard DF. External knee support in rugby union. Effectiveness of bracing and taping Sports Med 1998 May; 25(5):313-7.
2. Jerosch J; Thorwesten L; Hahnebeck H; Stutzinger N. [The influence of knee bandages on sport specific capabilities in healthy volunteers and patients with rupture of the anterior cruciate ligament] Der Einfluss von Kniebandagen auf sportspezifische Fertigkeiten bei gesunden Probanden und Patienten mit Rupturen des vorderen Kreuzbandes.] Sportverletz Sportschaden 1998 Mar;12(1):15-20.
3. Quinn K, Parker P, de Bie R, Rowe B, Handoll H. Interventions for preventing ankle ligament injuries. (Cochrane Review). In: The Cochrane Library, Issue 3, 1999. Oxford: Update Software.
4. Jerosch J; Thorwesten L; Frebel T; Linnenbecker S. Influence of external stabilizing devices of the ankle on sport-specific capabilities. Knee Surg Sports Traumatol Arthrosc 1997;5(1):50-7
5. Alt W; Lohrer H; Gollhofer A . Functional properties of adhesive ankle taping: neuromuscular and mechanical effects before and after exercise. Foot Ankle Int 1999 Apr;20(4):238-45
6. Lohrer H; Alt W; Gollhofer A Neuromuscular properties and functional aspects of taped ankles. Am J Sports Med 1999 Jan-Feb;27(1):69-75.
7. Hume PA; Gerrard DF. Effectiveness of external ankle support. Bracing and taping in rugby union. Sports Med 1998 May;25(5):285-312 .

8. Styf J. The effects of functional knee bracing on muscle function and performance. Sports Med 1999 Aug;28(2):77-81
9. Hopper DM; McNair P; Elliott BC. Landing in netball: effects of taping and bracing the ankle Br J Sports Med 1999 Dec;33(6):409-13
10. Albright JP; Saterbak A; Stokes J. Use of knee braces in sport. Current recommendations [editorial] Sports Med 1995 Nov;20(5): 281-301

Russell Kirkby
MBChB, MPraxMed, MSc(Sports Med)
Dept of Family Medicine, King Faisal Hospital, Riyadh, Saudi Arabia

CALLING ALL FAMILY PRACTITIONERS IN SOUTH AFRICA!

DURBAN 2001
16th World Congress of Family Doctors

WHERE? AT THE INTERNATIONAL CONVENTION CENTRE, DURBAN
WHEN? 13-17 MAY 2001
THEME: FAMILY MEDICINE: THE LEADING EDGE[1]

The 16th World Congress of Family Doctors promises to be the major event on the 2001 medical calendar. Already, over 500 doctors from around the world have registered, keen to come to South Africa. If you haven't registered yet, there's still time to take advantage of the special rate for Academy members who register before the end of February 2001.

If you think that R2 052 is too expensive, look at what you get for just R500 a day:

- You can obtain 24 of your compulsory CPD points at this Congress
- You can enjoy the benefits of a major international congress for the price of a trip to Durban
- You can meet your colleagues in family medicine from around the world
- You can share your experiences and learn from other family doctors
- You can take advantage of a programme that deals with the real issues faced by family physicians
- You will have a choice of satellite sessions and workshops that will improve you skills and bring you up to date with the latest in family medicine
- You will be able to sample the consulting room of the future
- You will be able to enjoy a social programme that will be second to none
- You will make new friends and renew old friendships in hospitable surroundings
- You will be able to enjoy the magnificent facilities of Durban's International Convention Centre – the same facilities that impressed the 12 000 delegates of the World AIDS Congress.

Daily Themes

The daily programme will include two plenary sessions, plus breakaway and satellite sessions. Each day will revolve around a specific theme relevant to modern family medicine.

Monday will deal with patient narratives and patient-centred medicine. The WONCA Global Call to Action on Smoking will also be announced on the first day. Tuesday will focus on women, the family and HIV/AIDS. Wednesday will focus on rural health issues, the context of family medicine today, human rights and quality assurance. The final day will be devoted to the Best Paper, Vignettes of Evidence-based Medicine from around the world and the Closing Ceremony – always a moving occasion.

Call for Abstracts

If you have some research you would like to share with your colleagues, there is still time to send in your Abstract. The Scientific Programme Committee, chaired by Prof Bruce Sparks is keen to have a wide range of topics and issues for family medicine today.

Topics could include:

- Conical practice, including quality assurance and HIV/AIDS
- Clinical, consultative, procedural and research skills
- Women's health issues (separate track)
- Rural and remote medicine (separate track)
- Medical ethics
- Using Information Technology
- Practice management and health economics
- Personal and professional development.

There are also poster sessions that offer further opportunities for doctors to share their research interests with their colleagues.

Accompanying Persons' Programme

Durban is the country's premier, all-year holiday destination, with superb weather in May. So why not bring your family along too for a holiday? There's also an innovative and wide-ranging programme for delegates' families. A carefully-structured series of one-hour talks and demonstrations will both inform and entertain partners and their families. Topics will revolve around South Africa's fascinating history and culture, its rich diversity, its flora and fauna, as well as its abundant marine life.

Whatever attracts you to the Congress, convenor Garth Brink and the Host organising Committee look forward to welcoming you to Durban in May 2001. Click on the Congress web site at and register now.

[1] ACCORDING TO BEST AVAILABLE EVIDENCE