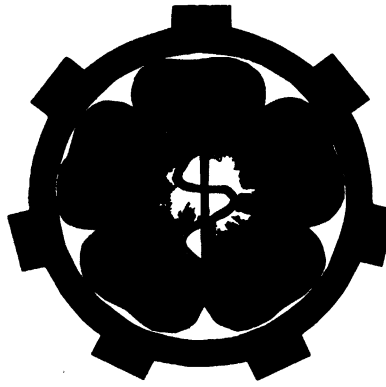
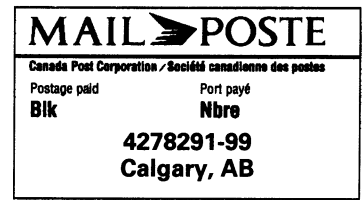


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ALBERTA OCCUPATIONAL MEDICINE NEWSLETTER

EDITORIAL COMMENTS

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This edition of the Alberta Occupational Newsletter focuses on two areas; the use of braces for a variety of musculoskeletal strains; and a brief description of a workplace study on the benefits of cardiac risk reduction activities in an occupational setting. Mr. Kevin Van Es, a physiotherapist with extensive experience in the use of a variety of splints discusses their use for injuries including lateral epicondylitis, carpal tunnel syndrome, and back and ankle strains. I've also reviewed the results of a two-year study on the benefits of back braces in the prevention of back injuries in a major U.S. retail chain store.

Dr. Charlotte Jones, from the Calgary Cardiac Network (CCN) has provided a brief overview of their prospective study on the benefits of trying to address cardiac risk factors via the workplace setting. It provides an excellent beginning for further studies in the area. It suggests that the workplace may be a good place to try to address cardiac risk factors. I encourage the reader to access the CCN's web page www.hearthealthcalgary.com for further details on their activities.

Ken Fryatt, MD, FRCPC
Editor

PRACTICAL BRACING CONCEPTS

Kevin Van Es, BSc, PT*

The rehabilitation world is continually seeing new bracing products with proposed treatment benefits. In conjunction with other rehabilitation approaches, bracing can be a useful tool in minimizing time lost from work following an injury. This article will expand on key concepts when considering using a brace to facilitate recovery. In closing, more specific thoughts on wrist, elbow, ankle and back braces will be summarized.

Introduction

The fundamental functions of bracing are to protect, immobilize, limit range of motion, provide support, mechanically guide and/or provide compression. Bracing also assists with improving confidence and proprioception, which are important in preventing re-injuries.

Limitations of the effectiveness of bracing often are related to poor compliance and improper use. Hence, proper fit and education are essential. It should be realized that the rehabilitation picture is often more complicated than simply altering or limiting a movement. Adjunct therapy should also be considered.

When to consider bracing

Understanding the mechanism of injury and intended goal of bracing are fundamental factors to be balanced.

A brace may be:

- Functional (dependent use),
- Rehabilitative (intended for temporary use during rehabilitation)
- Prophylactic (used during a specific activity to prevent injury/re-injury).

Traumatic or progressive work injuries often require a different perspective when considering various bracing techniques.

Traumatic Injuries

The severity of a traumatic injury may require immediate bracing for stabilization thus controlling inflammation, preventing further injury and decreasing pain. On the other hand a non-splinted injury will benefit from the increase in circulation that free movement provides thus facilitating the healing process and return of function. The latter situation may be indicated with less severe injuries.

Progressive Injuries

Repetitive movement patterns or habitual positions can often be identified when reviewing the history for a progressive onset or non-traumatic injury. A brace used to alter this pattern can help gain control of the presenting

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symptoms while potentially allowing an individual to continue working at various levels. Gaining control of the pain and symptoms with the use of a rehabilitative brace should not be considered the solution to the underlying problem. Addressing the various components of an injury are more often the fundamental factors in preventing a Rehabilitative brace from becoming a dependent Functional brace.

External Factors

Job demands and personality characteristics are two factors that may influence the recommended use of a brace. Physically demanding, unpredictable or very repetitive job demands will directly contribute to the expected healing time of an injury. Sufficient bracing can allow participation in a number of pre-injury job demands, providing symptoms are not being made worse. Personality characteristics such as having difficulty understanding limitations or pacing, can persistently re-aggravate an injury. A brace can provide a temporary forced limitation to protect these individuals.

Compensation

Whether the injury is traumatic or progressive, it is natural for the body to compensate for pain, injury or lost movement. Compensation can be within the injury area or expand through other areas of the body. This can lead to a more complex rehabilitation picture and potentially greater delays in getting an individual back to their pre-injury work level. In these situations, supportive use of a brace can assist in limiting the amount of compensation or altered movement patterns. Since a brace may also limit movement, close consideration and client education of the potential compensation while using the braces should be noted.

Ergonomics

An ergonomic assessment is necessary to identify and correct the precipitating movement patterns in order to avoid re-injury.

Prescribing a brace

When prescribing a brace the practitioner must take a number of

factors into account. Patient issues include compliance, comfort, cosmetics and cost. Local retailers can provide basic splinting devices at a reasonable cost. However for more customized or selective bracing an orthotist is likely the best option but will incur a greater cost to the patient. A Physical Therapist can also facilitate the proper use and fitting of a brace as well as initiate a rehabilitation plan. Becoming familiar with the various braces available and how clients respond to using a brace will help develop confidence in future bracing recommendations.

The proper fit and use of a brace is instrumental in reaping the benefits of recommending a brace. Follow up with the client's subjective reports of the brace effectiveness is essential.

• Ankle

When considering prescribing an ankle brace there are a number to choose from. Two of the more common braces are the lace-up and the stirrup style. Generally the lace up brace can be used for most ankle injuries and provides support in all planes of the ankle movement. It provides good compression and fits into most shoes. The stirrup braces, which also have the option of a hinged joint, are more specific in limiting inversion/eversion while allowing more functional dorsi/plantar flexion. The stirrup braces work well for the simple sprains and unidirectional instabilities, while the lace up braces can be more effective for the more involved ankle injuries. The stirrup braces with an air cast component may be partly dependent on the fit of the shoe to provide the compression to maximize the use of the air cast component. Fitting these braces into pre-existing footwear may be more difficult.

The fit of a brace for comfort should be a priority. Comfort will directly effect patient compliance. The fit may change when worn with the work shoes/boots. A few ankle braces may be too bulky to fit into an individual's footwear. Wear and tear is important when looking at the length of time expected to use the brace and the physical job demands.

• Elbow

Tennis elbow braces can be a simple strap or have gel packs and many adjustments. The challenge in prescribing an elbow brace is in understanding the underlying pathology and providing the most appropriate support with a brace. Lateral epicondylitis is commonly thought of as micro tearing at the extensor origin. A common philosophy of bracing this type of injury is to apply pressure to the extensor muscle belly thus mechanically altering the stress at the origin of these muscles. This change in stress may be due to pressure or angle of pull. An alternate thought is the brace can be used to alter the movement, alignment or stability at the radio-ulnar joint. Palpation of a significantly tender radio-humeral joint line may suggest joint involvement and indicate the need for appropriate stabilization of the radius. Clinically the writer has seen benefits with both approaches, depending on the assessment findings. When looking for specific compression or directional pressure, braces like the Aircast Armband have an air pocket, which can be specifically positioned for the above purposes. The simpler strap type braces provide a more general pressure and support.

Medial epicondylitis has a slightly different presentation and response to treatment. The writer has found clients do find improved comfort and tolerance to activity with a simpler broad neoprene or tensor elbow brace. The specific pressure of an air pocket does not seem to be as important with these injuries.

Prolonged bracing at the elbow may lead to weakness and decreased soft tissue integrity proximal to the brace because of disuse or over protection. Since the body normally strengthens in the lines of stress, progressive eccentric strengthening and weaning off the brace are important but can be difficult to balance. Guidance by a rehabilitation therapist would be indicated to facilitate this process.

A potential problem with the fit of a brace is having it move or slide down the forearm. The size and shape of an individual's forearm could indicate

looking at a brace made to limit slipping.

A common question asked by clients is how tight the brace should be. This varies from person to person, however, circulation should not be effected in the hand.

- **Wrist**

The reasons for bracing the wrist can be quite different than with other braces. Understanding and rationalizing the intention of using a wrist brace may help appropriately direct an individual in finding the most useful brace.

For conditions such as carpal tunnel or repetitive strain injuries, the goal is primarily to limit the wrist range of motion and overuse. Night bracing is a common initial intervention for conditions such as carpal tunnel to limit wrist flexion which facilitates more normalized circulation. The writer has found the Wristimer PM brace to be comfortable and effective for specific night splinting.

Functional wrist braces often have some form of metal stay, which may need to be adjusted to fit properly. Functional wrist braces attempt to minimize the frictional stress through the wrist area by optimizing the position of the wrist. The writer looks for features such as durability, increased thumb opening for better opposition, ease of one hand application and comfort when looking at primarily limiting the wrist movement. The Wrist Lacer is an example of a wrist brace with a few different styles with these qualities.

Various wrist braces also have the optional thumb support for conditions such as De Quervain's tenosynovitis. The different styles of these braces range from a very limiting brace (RynoLacer) to a more functional brace without a metal stay allowing functional use of the wrist while providing support and limitation of the thumb (TeePee Thumb Protector).

Important considerations when prescribing these braces would be the severity, history and response to therapy. It is also important to educate the client on the degree of

immobilization that a brace should provide. More complex conditions may require more specific or custom bracing. Comfort cannot be over emphasized with these braces for encouraging compliance and avoiding aggravational factors. Circulation should not be restricted in the hand.

- **Back**

There is a lot of controversy with back braces in the literature and clinical reports. There is not sufficient evidence to suggest back braces prevent or notably limit back injuries. Some research has proposed that injuries which occur while using a back brace may be worse than those that occur without, although the incidence of injury may be slightly decreased. The false sense of security a worker may feel while wearing a back brace may contribute to greater risk taking behavior leading to the possibility of a more significant injury. Clinically, a percentage of clients noted increased function and tolerance to activity with using a back brace. This may be more of a result of the proprioception or mechanical restrictions.

As with any brace, rationalizing the intention and function of a brace is fundamental. If immobility is the main goal, the size and width of the brace are important factors to consider. A number of braces also provide removable metal stays for extra support. If proprioception and cueing are the goals then the specifics of the back brace may be less important.

When looking at a back brace, consider if it is to be rehabilitative, functional, or prophylactic. There are many concerns with a back brace being functional because of the dependency issues and progressive decreased independent trunk stability. As with other complex injuries a comprehensive rehabilitation approach should be initiated to address issues from body mechanics/movement patterns through muscle imbalances and conditioning.

An important consideration with back braces is that cardiovascular screening is required. A tight brace around the torso has been shown to elevate the blood pressure and should be carefully

considered with an individual with a cardiovascular history.

Conclusion

Bracing can be a fundamental adjunct treatment tool to assist the individual returning to work. Braces can limit compensation and re-injuries while allowing safe gradual return to work. Proper prescription and use can be difficult but in conjunction with rehabilitation professionals can be more effective. This should include the initiation of a rehabilitation program even if only to ensure proper use of a brace and to identify any external or complicating factors.

References available upon request

*Physiotherapist, Columbia
Rehabilitation Centre

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LITERATURE REVIEW

Review of; A prospective Study of Back Belts for Prevention of Back Pain and Injury. Wassell J.T., et al, JAMA, Dec 6, 2000, vol. 284, No 21.

Dr. Ken Fryatt MD, FRCPC

This article describes a 2 year prospective study of over 6300 employees at a major U.S. retail chain who were required to lift heavy items, comparing the rates of back injuries, and back pain among employees who wore a back belt and those who didn't. The study was sponsored by NIOSH and the CDC.

The article concludes that there is no statistically significant difference for back pain or injury between employees who wore back belts versus those who didn't. These findings are consistent with the findings of a similar study conducted in 1994 by NIOSH.

The study mentions that the highest risk factor for a back injury is a prior back injury. Other risk factors cited (but

not actually studied) included frequent lifting of over 20 pounds, poor job satisfaction, being female, and smoking.

Of note is that the study focused only on stretchable nylon belts with no consideration of the effectiveness of stiff belts. The study doesn't address the severity of the back injury, the outcome, or the cost of the injury between the two groups. I think this would be a good area of future research.

Further details on this study and on the prevention of back injuries can be obtained at www.cdc.gov.niosh

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PERSONAL INVESTMENT IN CARDIAC HEALTH (PICH) EXECUTIVE SUMMARY OF STUDY

*Wendy Shah, RD; **Louise Sully, PhD, CPsych; **Clive Brewis, PhD, CPsych; ***Charlotte Jones, PhD, MD, FRCPC.

Purpose

PICH is a pilot study that was designed to evaluate a cardiovascular risk reduction program for employees within a corporate context. Staff at the Hypertension and Cholesterol Center at the Foothills Hospital developed the program in collaboration with the Department of Medicine at the University of Calgary. Occupational Health Nurses in the corporate sector helped design and implement the study. The study was designed to:

- Evaluate the usefulness of a set of learning modules on cardiovascular risk reduction. These modules provide current information on the cardiovascular risk factors, and the principles of behavioral change. The modules were designed to help community health workers promote heart health.
- Evaluate the usefulness of a set of small group sessions designed to help participants translate knowledge of cardiovascular risk into action.

More specifically, the study was designed to:

1. Teach employees about the behavioral, psychological and social determinants of heart disease
2. Assess and address employee readiness to change
3. Help employees assess and address those factors which hinder or promote health risk reduction
4. Help employees use self-management contracting as a tool to promote behavioral change

Participants

Occupational Health Nurses from five companies in the private sector recruited eighty-two participants. To enroll in the study, participants had to exhibit one of the following risk factors: strong family history of cardiovascular disease, hypertension, dyslipidemia, diabetes, or high levels of stress. Fifty-five participants (67%) were male and 27 (33%) were female. The mean age of the group was 45 years. Eighty-eight percent of participants completed high school and 54% had completed a university degree. The risk factor/medication profile of participants is outlined in Table 1. Please note that some participants had more than one risk factor.

**Table 1
Risk Factor/Medication Profile of Patients**

Risk Factor	Number of Participants
Heart Disease	4
Peripheral Vascular Disease	1
Stroke	0
Diabetes	8
Strong Family History of heart disease	44
Smoker	18
Stress	53
Taking a lipid lowering medication	4
Oral hypoglycemic agent or insulin	5
Taking an anti-hypertensive medication	18

Procedures

Occupational Health Nurses met with participants to review their pertinent

medical history and administer the data collection tools. They provided all participants with a set of learning modules upon admission to the study. This set of modules provides information on cardiovascular risk factors, and how to put this knowledge into action. Participants were then divided into six small groups and asked to attend six, 90-minute sessions over a six-month period. The sessions were held at the workplace over the lunch hour. A psychologist and a content specialist (either a cardiovascular nurse specialist or a dietitian) from the Hypertension & Cholesterol Centre facilitated these sessions. The occupational health nurse was in attendance. Sessions were designed to help participants assess and address readiness to change as well as barriers to lifestyle modification. Some of the groups were introduced to self-management contracting.

Data Analysis

Outcome analysis included pre-post assessment of patient readiness to change, lifestyle behaviors and change of the cardiovascular risk factors. Qualitative analysis included participant evaluation of the learning modules and the small group sessions.

Results

Clinical and Behavioral Evaluation

Fifty-six participants completed the follow-up evaluation and attended a mean of 4.2 sessions. Readiness to change scores did improve over the course of the study for eating habits and physical activity, i.e., many participants did put knowledge into action. Statistically significant improvements (p-value <.05, +/- 95% confidence intervals) were found for waist circumference, weight, systolic and diastolic blood pressure, eating habits, anxiety and depression scores, and the Framingham 10-year risk for coronary artery disease.

Participant Evaluation of PICH

Twenty-seven participants completed evaluations of PICH. Twenty-five participants indicated that they benefited from the program, while two reported that they did not. When asked to rate how much they benefited on a

scale of 1 to 10, the 25 respondents gave a mean response of 7.5 (standard deviation = 2.45). Participants cited the small group sessions as a particular strength of the program.

Evaluation of small group sessions

Participants were asked to identify the strengths of the small group sessions, to make recommendations for change, and to rate their satisfaction with the location, number and timing of the sessions. These results are provided below:

Strengths

- Group setting provided support, incentives and solutions
- Good information
- Attention to the change process
- Identification of barriers to change (see appendix A)
- Goal setting and self management contracting
- Easy access to experts

Recommendations for change.

- More sessions, particularly to focus on the change process and how to maintain change
- More follow-up time, both individually and in group
- Make program more accessible to the general public

Satisfaction ratings on location, number and time of sessions

Participants ranked their satisfaction, on a scale from 1 to 10, on location, number and time of sessions. Below are the results, with the mean rank and standard deviation being reported. Please note that the number of respondents is indicated in parentheses.

Location (N=28)

Mean = 8.79s.d. = 1.99

Number of Sessions (N=27)

Mean = 7.78s.d. = 1.62

Time of Day (N=27)

Mean = 8.59s.d. = 2.57

(there were 3 participants in this rating, who did not like giving up their lunches)

Discussion

Occupational health nurses involved in the study reported a higher level of confidence in identifying cardiovascular risk factors and counseling on behavioral change to reduce risk.

Results indicate that many participants did reduce their cardiovascular risk over the course of the program. However, since PICH was a pilot study without a control group, one cannot conclude that this improvement was due to participation in the program. Participant feedback on the program suggests that a randomized trial to assess program effectiveness may now be in order. In summary, many participants stated that:

- The learning modules were useful
- The small group sessions helped put this knowledge into action
- They learned about the change process

- They learned to assess and address those factors which hinder or promote health risk reduction
- They learned about self-management contracting as a means to promote behavioral change

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*Dept. of Dietetics, Foothills Medical Centre (FMC)

**Dept. of Psychiatry, FMC

*** Clinical associate professor of medicine, specialist in Endocrinology, Medical Director of the Calgary Health Region Hypertension and Cholesterol center

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The Calgary Cardiovascular Network (CCN) is a local group whose mandate is to work together with all interested parties to prevent and control cardiovascular disease in our communities. The network involves both the health care sector and the non health care sector. It is a group of dedicated individuals who advocate for improvements in our community to promote good cardiovascular health and prevention of cardiovascular disease through heightened awareness and coordination of ongoing activities.

Learn more at our website: www.hearthealthcalgary.com

UPCOMING CONFERENCES & PROGRAMS

CANADA:

- **First International Conference on Symptom, Diagnostic and Disability Validity: Improving Patient Outcomes**

There will be a post-Conference Workshop Clinical Assessment of Malingering and Deception, Monday, September 30, 2002

September 26 - 29, 2002
Toronto - Markham, Ontario

Contact: PMRF
Suite 204
856 Homer St
Vancouver, BC V6B 2W5
Web: www.icpro.org Email: pmrf@icpro.org

- **McGill Master's Degree in Occupational Health Sciences (MScA) Distance Education Program**



McGill University offers a Master's degree in Occupational Health Sciences (MScA) through a Distance Education format. This program is intended for occupational medicine physicians, occupational health nurses, industrial hygienists, & safety professionals.

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Contact us for more information such as course selection, schedule, fees and admission procedures. Please note that the application deadline is APRIL 1st (Fall admission - September) and OCTOBER 1st (Winter admission - January)

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Website: <http://www.mcgill.ca/occh/distance>

INTERNATIONAL

- **American Occupational Health Conference: Workforce of the 21ST Century**

Annual Meeting of the American Association of Occupational Health Nurses, Inc. and the American College of Occupational and Environmental Medicine

April 12 - 19, 2002
Chicago, IL

Contact: ACOEM Education Department
1114 N. Arlington Heights Road
Arlington Heights, IL 60004
Phone: 847-818-1800 Fax: 847-818-9286
Web:
www.acoem.org/aohc/aohc2002/aohcflyer.pdf

- **XVI World Congress on Safety and Health at Work: Innovation and Prevention**

May 26 - 31 2002
Vienna Austria

Contact: Congress Secretariat
Allgemeine Unfallversicherungsanstalt
Kongressbüro
Adalbert Stifter-Strasse 65, A-1200 Vienna,
Austria
Tel. (+43 1) 33111-537
Fax: (+43 1) 33111-469
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For a more complete listing of conferences check out our website at www.med.ucalgary.ca/oemweb

WEB NEWS

At our home site (www.med.ucalgary.ca/oemweb) you can view the archive of this newsletter. Our most recent editions are available in PDF format.

For more information about back belts and the ergonomics of lifting we recommend the following sites:

- Alberta Workplace Health & Safety,
 - **Let's Back Up a Bit – Some Truths About Back Belts:**
www3.gov.ab.ca/hre/whs/publications/pdf/ph003.pdf
 - **Lifting and Handling Loads (a three part series)**
www3.gov.ab.ca/hre/whs/publications/pdf/bcl001.pdf
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