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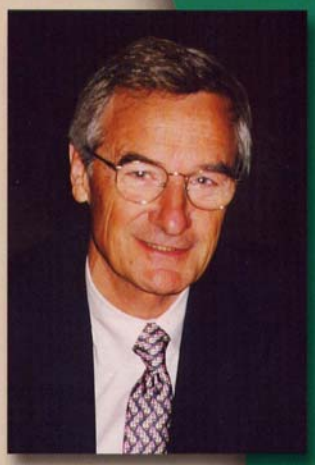
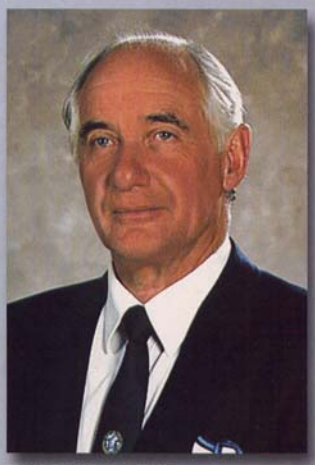
WORLDWIDESPINE

& Rehabilitation

Interview *with* Stanley V. Paris



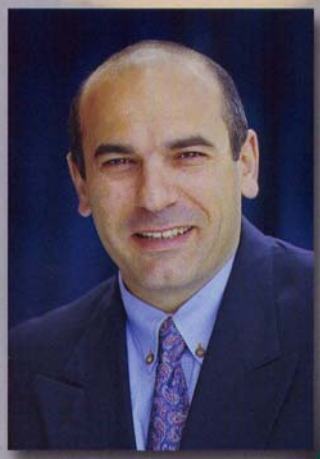
STANLEY V. PARIS, *PT, PhD*



ROBIN McKENZIE,
CNZM, OBE, FCSP (HON), DipMT

Patient Heal Thyself

INSIDE!
Mulligan Concept Management of "Tennis Elbow"



ROBERT DE NARDIS, *B App Sc (Physio)*

***The* Hanoun Multi-Cervical Unit**

ALSO INSIDE

SPINE, SPORTS, ORTHOPEDIC, & INDUSTRIAL REHABILITATION ARTICLES FROM AROUND THE WORLD

THE PHYSICAL THERAPY MAGAZINE FOR THE CLINICIAN

The Hanoun Multi-Cervical Unit

Flexible exercise delivery for individualizing neck rehabilitation programs.

Robert De Nardis
B App Sc (Physio)

By Robert De Nardis, B App Sc (Physio) and Jenny Keating, PhD

There are some preliminary studies investigating the response to strengthening programs in people with neck pain (Berg et al., 1994; Jordan et al., 1998; Highland et al., 1992; Levoska et al., 1993; Nelson, 1999; Randlov et al., 1998; Taimela, 2000; Ylinen, 1994). Significant increases in strength and significantly reduced pain and disability are repeatedly demonstrated. Many of these studies do not compare the effects of exercise to the effects of time alone. When such comparisons are made (Levoska et al., 1993), control subjects did not improve in strength scores during a five-week intervention period.

In further support of the likely benefits of exercise for people with chronic neck pain, Randlov et al. (1998), in a well-designed, randomized controlled trial, found that intensive exercise conferred significantly greater benefits than light exercise. Hence, it is unlikely that the consistent findings of strength changes and pain decreases associated with exercise programs for people with chronic neck pain are due to time alone. Nevertheless, quality randomized control trials are required to establish strong evidence of an effect due to exercise programs. In addition, information is required on the magnitude of exercise-related strength changes and exercise-related changes in pain and function.

The types of exercise programs vary from study to study in the intensity, frequency, and duration of exercise, and the muscle groups that are exercised. No justification is provided why any one program is better than another, and clinicians are left to decide what type of exercise to prescribe on a case by case basis. Another confounding factor is that exercise is almost certainly not good for everyone, but the presenting characteristics indicating a likely benefit of exercise have not been identified.

Within this climate, trial by therapy is the way clinicians decide if

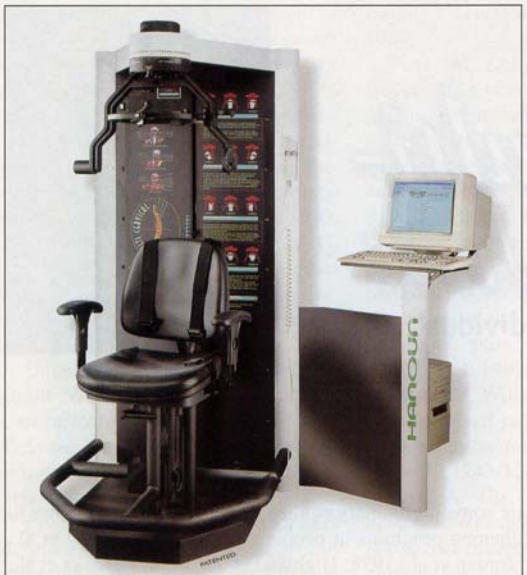


Figure 1: The Hanoun Multi-Cervical Unit

exercise is beneficial. A limitation has always been that exercise prescription is imprecise, inviting the opportunity for aggravation of the condition and client dissatisfaction. Alternatively, inadequate resistance with exercise might diminish the possible benefits of the prescribed exercise. The level of resistance provided and the part of the range in which exercise occurs have often been difficult for the clinician to quantify and progress with accuracy.

For these reasons, the Directors of the Melbourne Whiplash Center (MWC) were immediately interested when they first became aware of the Hanoun Multi-Cervical Unit (MCU) (Figure 1). They had developed a common sense approach to neck rehabilitation in their Sports Injury/Physiotherapy Center in Melbourne, Australia by applying a sports injury rehabilitation model to the treatment of chronic neck pain. The active, functional approach facilitated by the Hanoun MCU seemed a logical step to take.

The Hanoun MCU provides objective measurements of cervical spine range of motion (ROM) and isometric strength.

The major features of the Hanoun MCU include:

1 A multi-axial head brace that allows free motion of the cervical spine for ROM assessment.
2 A dynamometer to measure isometric cervical strength.
3 Sophisticated software and computer technology that records and displays real-time data analysis.
4 A pin-loaded weight stack with 0.5 lb. increments, allowing measured resistance in the rehabilitation of the cervical spine.

In 1997, the MCU came with few instructions for its therapeutic application. Consequently, the directors of the MWC systematically evaluated procedural options, and standardized assessment procedures for clients with chronic neck pain. This led to the development of what is called the Melbourne Protocol.

Our initial goals were to:

1. Develop the pathway of best practice for the treatment of neck dysfunction.
2. Establish the reliability of the Melbourne Protocol assessment .
3. Define the validity of the Melbourne Protocol rehabilitation program for the treatment of neck pain.
4. Promote our findings through the manufacturer of the MCU (Hanoun Medical) and provide training for other MCU users.
5. Establish a worldwide network of like-minded practitioners who specialize in the management of chronic neck pain.
6. Standardize assessment and treatment methods across this network.
7. Standardize the measurements taken of people with neck pain, so we could combine and analyze this data.
8. Use assessment and outcome data to determine which individuals are likely to respond to exercise programs, which individuals are likely to be aggravated by such programs, and which individuals will benefit from different or additional therapies.

The reliability of the Melbourne Protocol has been addressed in two phases. The first phase, conducted in 1998, was a study conducted at the Melbourne Whiplash Center on the reliability of the measurements of strength and ROM in unimpaired subjects. A trial was designed in which 26 subjects were assessed by three therapists, blind to each other's measurements. Tests were repeated one week later. This design allowed quantification of variability in repeated measurements taken by one, or different observers. Test-retest data was highly correlated for all strength and range of motion tests. Retest correlations were high, averaging .79 (range .53 - .9, SD .09). The standard error of all measurements of range of motion had a mean of 4.1 degrees (sd .8) and ranged from 3.1 degrees to 5.7 degrees. This represents excellent utility of the measurements for judging clinically important change, if the error margins end up similar for subjects with known impairment. The standard error of all measurements of strength of movements had a mean of 2.4 lbs. (sd .8) and ranged from 1.5 lbs. to 4 lbs. The second phase, a study of the reliability of measurements of subjects with neck pain, will commence in January 2002.

Initially we collected data for 123 patients who went through a program of treatment varying from 3 to 18 weeks (average 6.9 weeks). Subjects were 16 to 68 years

old (mean 40.4 years) and 34% were male. The duration of time since injury ranged from 1 to 540 months (mean 98.0 months). At present, follow up data is available on 59 subjects. Results indicate that strength and range of motion were significantly improved during the program, and that perceived disability decreased during the program (manuscript in preparation). Treatment gains persisted over 6 months. Follow-up assessments indicate that on average 98.2% of functional gains, 90.1% of range of motion, and 76.5% of strength gains were maintained.

These changes may have occurred spontaneously, but the longstanding chronicity of the problems experienced by the majority of people in the program argues against an interpretation of the findings due to spontaneous change.

Improvement may have been due to a non-specific treatment (placebo) effect. If this is the case, it is a placebo effect that has not been achieved over a very long period of time by other treatments given to these patients. Nevertheless, to convince ourselves that the program was responsible for the observed changes, we plan to conduct a randomized controlled trial in 2002 comparing effects in the intervention group to effects in a wait listed control group.

THE MELBOURNE PROTOCOL

The initial assessment protocol is conducted over two sessions, each of one hour's duration, and involves:

1. History taking
2. Objective questionnaires, neck disability index, and recording twelve symptoms using a visual analogue intensity rating scale.
3. Objective ROM for cervical flexion, extension, lateral flexion, and rotation
4. Objective isometric testing of the cervical flexors, extensors, and lateral flexors in a total of 16 different movement combinations.

The test results are then analyzed. ROM values are compared to normative data supplied by the American Medical Association. Isometric strength values are compared to the isometric values achieved by over 1200 current responders.

Individual rehabilitation programs are then derived for the patient considering their strength deficits, muscle strength imbalances, and flexion/extension strength ratios.

The program design is modified according to observed restrictions in ROM and to positions in ROM where movement is painful. A great asset of the MCU is the option to use both auditory and physical cues to keep the patient exercising through pain-free ROM.

The initial resistance to exercise is determined by the patients' level of irritability and their response to the initial assessment. Typically, this resistance is between 25-40% of their maximum isometric test result. A target number of sets/reps is set (typically 3 x 10). The principles of graduated challenges to strength and ROM are applied to progress treatment. Subjects are provided with resistance to movement that constitutes a moderate challenge. Although the presence of pain dictates the range through which subjects are exercised, they are encouraged to use as much of their available range as possible. Resistance to movement is increased as tolerated, if it can be managed without a loss in ROM.

Patients undergo reassessment of all baseline measurements after every nine rehabilitation sessions, and the MCU software allows for a comparison of results to baseline readings. The rehabilitation goals are to restore target strength where weakness is identified and to restore ROM where limitations occur.

Outcomes from all centers utilizing the Hanoun MCU and the Melbourne Protocol are sent to the MWC and La Trobe University for analysis. Currently data on over 1200 subjects is available. Clinicians using the MCU are treating patients who have had symptoms for an average of 8.3 years. Strength gains averaged 105% across the 1200 subjects. 74% of patients respond to the treatment, a responder being a patient who reports to be "significantly" better and whose NDI score diminishes by 20% or more upon reassessment. We are in the process of analyzing the presenting characteristics of the non-responders. If we can recognize and recommend alternative therapy for non-responders, we can hope to further improve the response rate. Presently, we have identified four common characteristics in this group of non-responders.

For example, if a patient has an exacerbation of symptoms which lasts longer than 36 hours post- initial assessment, then they are excluded from the rehabilitation program.

The Directors of the Melbourne Whiplash Center would like to acknowledge the involvement of Hanoun Medical, who have been very supportive of our efforts in research and development of the Melbourne Protocol. They have endorsed the Melbourne Protocol as their recommended protocol when utilizing the MCU for rehabilitation of chronic neck pain. There are now approximately forty centers around the world specializing in the management of chronic neck pain, twenty-seven in the United States, six in Australia, three in Canada, and one in the United Kingdom.

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NOTE

For further information regarding the research conducted or planned at the Melbourne Whiplash Center contact Robert De Nardis via email: rjd@whiplashcentre.com.■