THE CHIROPRACTIC REPORT

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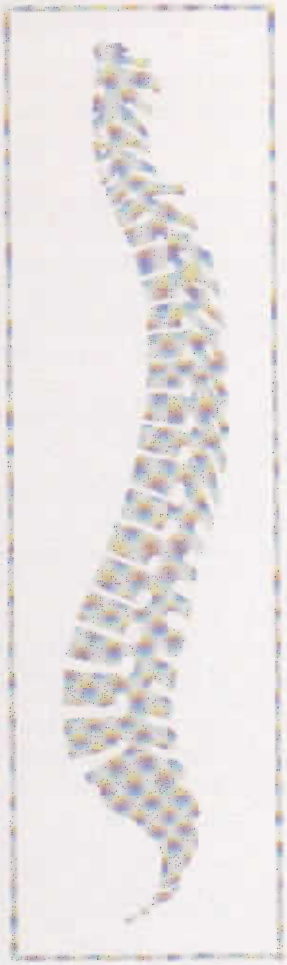

Professional Notes:

Marathons and Overuse Injury

'Incidence of Training-Related Injuries among Marathon Runners', Maughan RJ and Miller JDB (1983) British Journal of Sports Medicine 17(3):162-165.

This study was to determine the frequency and nature of injury to recreational runners training for a marathon, and the authors find that "runners preparing to compete in marathon races can expect their training to be interrupted by injury".

• A questionnaire was sent to all entrants (n 960) in a city marathon race (Aberdeen Milk Marathon, Scotland). 497 replies were received.

• 6 in 10 runners (287 – 58%) reported injury from training. 75% of these suffered interruption to training, which varied from several days to several weeks. 6% never recovered pre-race, 43% reported partial recovery, only 51% full recovery.

• Almost all injuries were to the leg and hip, with the largest number (32%) to the knee. The great majority of knee injuries were to the anterior aspect.

• Many of the injured runners "expressed a marked reluctance to seek professional help" and 55% did not do so. Rest and 'strapping' were the most common treatments prescribed by MDs, ultrasound by PTs.

Precise mechanisms of overuse injury are not yet known. (See this Report, main article, para 9). It seems that none of the runners in this study considered the chiropractic approach to prevention

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Sports Chiropractic

A. Introduction

1. 75% of the San Francisco 49ers (35 of the 47 players), including star quarterback Joe Montana, consulted their chiropractor during the final 24 hours before winning the Super Bowl in January 1990.[1] (The U.S. National Football League has official chiropractors in each NFL city).

There were 16 accredited chiropractors from 12 countries at the 1988 Seoul Olympics (plus six attending as competitors)[2] and the U.S. Olympic Committee, which has recognized appropriately experienced chiropractors on the same basis as MDs since the early 1980s,[3] appointed a chiropractor – Jan Corwin of Oakland, California – as one of the five U.S. team (i.e. all sports) doctors.

Tennis star Martina Navratalova has had a personal chiropractor in her entourage for a number of years. Many athletes in less prominent sports who rely on premium coordination and balance, such as Canadians Caroline Waldo (Seoul Gold Medallist in synchronized swimming), James Spratley (shooting world-record holder – smallbore prone) and Elizabeth Manley (Silver Medallist, Women's Figure Skating, 1988 Calgary Winter Olympics) receive regular biomechanical assessment and manipulative care from chiropractors during training and competition. Why?

2. Many high-performance athletes and their coaches have found that sports chiropractic practice has a major role in three areas of prime concern to all athletes:

• Maximum musculoskeletal coordination, economy, speed, and strength – to enhance performance. (Subtle improvements in body mechanics and neuromuscular control are the difference between mere participation and success in top level sport today).

• Prevention of injury – avoiding the physical and psychological impact of interruption to training.

• Managing injury – fastest possible rehabilitation and, for many, training and competing with minimum inconvenience from the continued effects of former injury.

3. Where a chiropractor is working alone, or with a limited health care team, he/she may have as wide a role as in general chiropractic practice, including:

• A primary care responsibility for diagnosis – differentiating, for example, underlying disease and bone fracture from joint dysfunction.

• A broad therapeutic role – for example nutritional advice, prescription of exercises and supports, taping, use of heat, electrotherapy and other physical therapy modalities.

In the real world this is frequently the case, with much sports practice done on a voluntary basis or under financial restraint. Chiropractic postgraduate programs and texts, such as Schafer's 'Chiropractic Management of Sports and Recreational Injuries',[4] address this scope of practice.

However the focus of chiropractic practice, and the area in which chiropractors can justly claim greater education, understanding and skill than other health professionals, is the diagnosis and manipulative treatment of joint dysfunction and its effects – and this will be the focus of this Report.

4. Factors that have caused rapid growth of sports chiropractic practice during the past 15 years include:

a) The explosion of basic scientific research of sport biomechanics, and the new appreciation of the importance of full range of joint motion to optimal, economic, injury-free performance. (See paras 10-19).

b) Growing research evidence that skilled manipulation (controlled, high-velocity techniques that take the joint beyond the passive range barrier) is effective[5,6,7,8] and superior to other manual techniques[9,10] in restoring range of joint motion and removing acute pain.

c) The greater acceptance this has brought for manipulation and chiropractic in the scientific and health care community. (Writing a comprehensive review of management of back injuries in Clinics in Sports Medicine in 1983 Curtis Spencer MD makes no mention of manipulation or chiropractic.[11] In 1986, acknowledging that understanding and treatment of spinal pain "has lagged between ... other musculoskeletal disorders", Spencer presents a detailed review of 'Spinal Manipulative Therapy in Sports Medicine' by chiropractor and neurologist Scott Haldeman, DC MD Ph D.[8])

d) Better organization of the discipline of sports chiropractic, in terms of postgraduate education, journals and texts, national and international associations.

(The Federation International de Chiropratique Sportive (FICS), the international organization representing

national associations of sports chiropractors, now has over 40 member nations. Its 1989 annual congress, held in Rome, Italy as a prelude to soccer's 1990 World Cup, featured leading sports scientists from Europe, the U.S. and the Soviet Union. Its activities, together with current research, are now reported in the journal Chiropractic Sports Medicine, published since 1987 by Williams and Wilkins).

e) Finally, but as important as any other factor, the demand and support for chiropractic by high-performance athletes, national coaches, and their associations.

(The application by Canadian sports chiropractors for membership in the Sport Medicine Council of Canada, for example, was made by the Coaching Association of Canada, with the written endorsement of 17 national amateur sport organizations (e.g. the associations representing track and field, swimming, cycling, basketball, etc.) and the Canadian Olympic Association Athletes Council[12]).

5. This Report now looks at:

• Sport biomechanics and chiropractic – what is known, what is not, and the implications.

• The specific expertise and goals of chiropractic sports care when given, as ideally, in the context of a full sports medicine team. As the actions of the San Francisco 49ers suggest, the goals of prevention of injury and enhancement of performance are as important as timely recovery from injury.

B. Sport Biomechanics and Chiropractic

6. Research in what is now known as the 'sports sciences' – exercise physiology, motor learning, sport and exercise biomechanics, and exercise biochemistry – is today the province of specialist scientists, not health care researchers in professions such as chiropractic or medicine.

7. Levels of sophistication and the rapid expansion of knowledge can be illustrated from the science of sport biomechanics ("study of the forces acting on the human body and the effects produced by these forces" in sport[12]) as follows:

• Today complete texts are written on the biomechanics of individual sports. Scientists devote whole careers to investigating the biomechanics of throwing, or rowing (a recent text presents 70 pages and hundreds of references on sculling mechanics[14]) or speed skating (with research of centre of gravity, air friction, ice friction, work per stroke, the biomechanics of skating the curve, etc.).

• There are now over 600 published papers on the biomechanics of running. Scientists research the total internal forces on a joint exerted by muscles, ligaments and all other tissues and surfaces, and plot resultant joint forces (RJFs) and resultant joint moments (RJMs) for each joint. This allows them to then analyze the relevant metabolic cost of different types and speeds of muscle contraction, and report on the running economy of different stride lengths and exactly what relation should exist between the strike point of a sprinter's foot and centre of gravity.[15]

• Catering for this burgeoning science are new national and international societies (US (1977), Canada (1980), Europe (1980), and the International Society of Biomechanics (1973)) and publications (e.g. International Journal of Sport Biomechanics (1985)).

8. A reading of the research, and current reviews of it by respected sports scientists, reveals two things:

a) There are sophisticated investigative techniques and a body of data unheard of ten years ago.

b) There is still relatively little information of practical value to athletes, their coaches, and their health care providers – 'applied biomechanics' offers few certainties.

9. Thus Williams Ph D, in a comprehensive review of the biomechanics of running, concludes:[16]

• There are few areas where there is clear evidence that one method of running is best and those "interested in knowing the correct mechanics of running will be disappointed".

• Although scientists can make sophisticated measurements of movements and forces "there is little information available concerning the mechanism of injury to human tissues during running".

• While it is known that neuromuscular coordination is "fundamental" to understanding the biomechanics of human motion, and there is "a wealth of information ... concerning general neuromuscular activities in human movement", there is little that explains exactly "how neuromuscular integration is important to running performance, economy or injuries".

• With over-use injuries, for example, at present "clinicians have no choice but to come up with preventive and rehabilitative strategies despite not having clear information as to the mechanisms involved".

• Athletic coaches daily make decisions on "the influence of running mechanics on performance or injury, but the number of diverse opinions among them as to the characteristics of optimal performance is surpassed only slightly by the number of coaches".

10. Putnam Ph D and Kozey Ph D observe that different running styles have significantly different mechanical energy costs, that evidence does not support the view that athletes adopt an efficient style, and that measuring and interpreting running efficiency are "difficult and as yet unsolved problems".[17]

11. Accordingly little is cast in stone on current scientific knowledge. However there are certain basic concepts of significance to sports chiropractic practice emerging from the research in sports biomechanics and related sciences.

The Linked System

12. Since 1945 investigators at the Biomechanics Laboratory, University of California, Berkeley have gathered data on normal and abnormal walking, funded by the NIH, NASA and many other U.S. governmental agencies. 35 years of extensive research was summarized by Inman MD Ph D, Ralston Ph D et al in the text 'Human Walking.[18] They conclude:

"... *it can be stated, with considerable assurance, that the loss of the contribution of any single component in the neuromusculoskeletal apparatus leads to compensatory changes in the remaining functional parts".*[19]

Loss of muscle strength or a range of joint motion produces altered and abnormal function elsewhere, and affects overall output.

13. The body, Putnam and Kozey observe, must be viewed as "a constrained linked system". Any biomechanical analysis that treats "segment motions as if they were independent of each other... and total body mass" are "clearly inappropriate".

Force and moment applied to one segment (joint) of this linked segment system, and motion of that segment, are dependent on

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Professional Notes: *continued from page 1.*

or treatment of such injuries – assessment and correction of biomechanical dysfunction at the symptomatic joint and throughout the linked musculoskeletal system.

It would be nice – if rather expensive – to compare three populations of athletes preparing for a marathon – those receiving preventive chiropractic care, those receiving chiropractic treatment for injury, and those receiving no preventive care and alternative management of injuries.

Back Pain – How to Measure Improvement?

Traditionally, objective, professional measurements such as passive straight leg raise (SLR) have been thought reliable and 'hard evidence'. Subjective patient assessments of pain relief and improvement of function have been crticized as 'soft evidence'. No more. At the recent Consensus Conference on Validation of Chiropractic Methods, held in Seattle March 2-3, 1990 and co-sponsored by the ACA, Pacific Consortium on Chiropractic Research and Washington Chiropractic Association, Richard Deyo MD MPH (University of Washington), Daniel Cherkin Ph D (Center for Health Studies-GHC, Seattle) and Howard Vernon DC FCCS(C) (Director of Research, Canadian Memorial Chiropractic College Toronto) explained:

• LBP patients don't die and many are not 'cured' – as a result *function* and *symptoms* are the two most relevant things to the patient and society.

• A measure of function is 'hard' if it is reproducible.

• Current research shows that measures once though to be 'soft' – patient assessments of pain reduction, satisfaction, ability to perform activities of daily living (ADL) – are in fact reproducible and hard when using proven questionnaires or, in jargon, 'survey instruments'. (e.g. Oswestry, Roland, and Sickness Impact Profile (SIP)).

• Survey information is simply out-performing health practitioner measurements traditionally thought more reliable and hard. Compare these reproducibility coefficients (where 1 = perfect reproducibility).

Practitioner Measures	
Anterior spinal flexion on x-ray	.50
Passive straight leg raise	.78
Survey Information	
Pain (visual analog scale)	.94
Activities of daily living (SIP)	.90

(Deyo)

• The debate on length of questionnaire goes on – longer ones are more reliable, shorter ones more feasible. Straight comparative studies of different questionnaires are just starting.

• However, in summary, to test the effectiveness of a health care intervention for low-back pain *"don't just measure – ask the patient (using a modern questionnaire)!"*

The full proceedings of this important conference are to be published in the August 1970 issue of Chiropractic Technique – you will want to read this. One strength of the meeting was that it brought in the outside experts – people like Deyo, Cherkin and Paul Shekelle MD MPH from Rand Corporation. Another was that, for the first time, all aspects of the chiropractic community were represented – technique developers from all systems, ordinary clinicians, professional leaders, educators and researchers. There have been good individual efforts at validation of chiropractic methods and Kaminski et al, from Northwestern College of Chiropractic, produced a sound validation model in 1987 – incorporating the basic elements of clinical research and consensus methods using an appropriate panel of experts. (Kaminski M et al (1987) 'A Model for the Evaluation of Chiropractic Methods', J Manipulative Physiol Ther 10:61-64).

However at this meeting there was broad agreement on the need for greater effort in validation. It is exciting news for chiropractic that appropriate patient survey information is now hard evidence of validity – in studies to date chiropractic has done well in this area. (For a recent study see 'Patient Evaluations of Low-Back Pain Care From Family Physicians and Chiropractors' Cherkin D.C. and MacCornack, F.A., Western Journal of Medicine (March 1989) 150(3):351-55).

Skeletal Muscle: Some Facts and Figures

• Skeletal muscles have wrappings of connective tissue which blend into tendons, which attach the muscle to bone. This harness enables muscles to move bone, transforming chemical energy (ATP – adenosine triphosphate) into mechanical energy and motion.

• 75% of skeletal muscle is water, 20% is protein, and the remainder consists of inorganic salts, enzymes, pigments, fats, and carbohydrates.

• The sarcomere, the functional unit of the muscle cell, contains two types of filaments:

Thick – comprising the protein myosin.

Thin – comprising the protein actin.

In an average sized muscle fiber there are 4,500 sacomeres comprising 16 billion myosin filaments and 64 billion actin filaments.

• Thick and thin filaments are linked by projections or 'cross-bridges'. Contraction of muscle occurs when calcium activates the myosin (thick) filament cross-bridges to attach to the actin (thin) filaments. Relaxation results from reduction in concentration of calcium. Two proteins play a supportive role:

Tripomyosin – which inhibits interaction between thick and thin filaments.

Troponin – which encourages interaction.

• The dominant theory, the 'sliding filament theory', is that a muscle shortens or lengthens because the protein filaments slide past each other without changing length.

• The two types of muscle fiber, classified by contractile and metabolic qualities are:

FG fibers (fast-twitch) – *fast* speed of contraction, high *glycolytic* properties, energy mainly generated anaerobically and quickly for a rapid powerful contraction.

SO fibers (slow-twitch) – *slow* contraction speed, reliance on *oxidative* metabolism (i.e. oxygen gained from current breathing rather than stored supply in body).

(An intermediate fast-oxidative-glycolytic (FOG) fiber also exists).

• Percentage distribution of fiber type differs significantly between muscle groups in each person (see Rudolf editorial), and between different people. The distribution appears to be determined by genetic code, and cannot be changed significantly by physical training. What this training alters is the metabolic capacity (strength and endurance) of the muscle fibers present. Fibers increase in bulk, but not in number.

• In vigorous exercise, the muscle's oxygen consumption increases nearly 70 times above the resting level. This metabolic demand requires immediate adjustments, but also longer term training adaptations in the local vascular bed.

Points

Dysmenorrhea

• An excellent case report on dysmenorrhea appears in the February 1990 issue of JMPT. ('A Chiropractic Approach to the Treatment of Dysmenorrhea', Liebl NA and Butler LM, J Manipulative Physiol Ther 13(3):101-106). A detailed discussion of history, examination, treatment and probable mechanisms has much of immediate clinical value.

The fully described protocol (over 7 months – 4 to establish baseline and 3 for treatment and results) could be put to use in your practice tomorrow. (It is purely anecdotal – but nonetheless interesting – to observe that the patient experienced early then continuing relief for a significant problem. Treatment, twice weekly for two months, involved adjustment of subluxation or fixation at lumbar and sacroiliac levels and soft tissue therapy at various spinal levels as described).

Main Article: *continued from page 2.*

the forces and moments applied "to all other segments . . . *and ultimately the manner in which segments interact*".[20]

14. The implications of this are reduced to clear language by Robert Watkins, orthopaedic specialist for Orel Hersheiser and the rest of the pitching staff of the L.A. Dodgers, where he observes that "pitching speed is trunk strength".[21] The musculoskeletal system acts as, and must be examined and treated as, one integrated system.

15. This is fundamental to a chiropractic approach to management. Gitelman DC, explaining this approach and criticizing earlier medical studies of manipulation which concentrate on symptoms or dysfunction at one spinal level only, says:

"A common problem (in these trials) is the failure to recognize the fact that a practitioner of spinal manipulative therapy must make two diagnoses rather than one. ... The integrated approach must be to first diagnose the lesion ... with its local tissue responses. Secondly an assessment of the ... broader status of the statics and dynamics of the locomotor system of the patient must be made. Only after reaching these two decisions can the practitioner identify the syndrome which he will treat."[22]

Thus in clinical trials chiropractic researchers, making their research consistent with chiropractic practice, do not limit manipulation to one joint or segment, but allow joint adjustment at any level of the spine, pelvis or extremities where restricted function is found and considered relevant.[23,24] (This design feature is now being used in medical trials of manipulation.[25])

Dysfunction and Efficiency

16. The musculoskeletal system, which comprises over 60% of the body, expends most of the body's energy. Any increase in activity of the musculoskeletal system calls upon the internal viscera (organs) to develop and deliver the necessary energy. Inman, Ralston et al[26] note two important facts established by biomechanical research:

- Loss of function in any segment decreases the efficiency of the whole neuromusculoskeletal system, causing increased energy expenditure at a given speed; and
- This inefficiency becomes more marked as speed is increased.

17. By way of illustration, Greenman DO reports that restriction of one major joint in the lower extremity can increase energy expenditure for normal walking by 40%, restriction in two major joints in the same extremity by 300%.[27] For athletes correct joint and muscle function is important for *efficiency of energy expenditure* as well as freedom from injury and optimal range of motion.

Neuromuscular control

18. Execution and control of skilled movement lies, to use the words of Putnam and Kozey, "at the level of the neuromuscular system".[28] Sports scientists can now document how neuromuscular integration and training is central to enhancement of performance.

- Enoka Ph D describes a central role for the nervous system in development of strength, and concludes "it is probable that increase in strength can be achieved without morphological change (i.e. increased bulk) in muscle, but not without neural adaptation"[29] (i.e. adaptive changes in the nervous system).
- As an example of such neural adaptation to increase strength, consider a recent study by Rutherford who demonstrated a 200% increase in quadriceps *weight lifting ability* after 12 weeks of conventional extension exercises.

However the increase in *maximum isometric force* (strength) of the quadriceps was only 11%. Some of the increased lifting ability came from linked muscles involved in leg extension. Much more, he suggests, comes from neural adaptation – better activation and coordination of muscles through improved neurological function.[30]

- 'Cross training' studies show that where the right arm is trained for increased muscle bulk and strength, subsequent EMG recordings demonstrate increased strength not only in the right arm *but also the untrained left arm*. This results from 'central neural adaptation' – improved neurological function on the opposite side of the body mediated through the central nervous system.

19. This is of particular relevance to chiropractic, which has always viewed nerve interference, or influence on neurophysiology, as the most important aspect of spinal joint dysfunction. (Medical manipulators have traditionally emphasized purely mechanical aspects of dysfunction and manipulation, but current leaders such as Lewit MD [31] and Greenman DO[32] agree that neurology is at the foundation of manual medicine). In summary:

- Spinal and paraspinal tissues are rich in *sensory* neurons (nerve cells) that perceive pain (nociceptors) and give information concerning the position and movements of the body (proprioceptors), and in *motor* neurons – the nerve cells that fire the muscles.
- An immensely complex array of nerve circuits, still only little understood by health scientists, links these various nerve cells. The central nervous cord, which runs inside the vertebral column and exits via a pair of spinal nerves at each vertebral joint, plays a central role in integrating and modifying neurological activity. Its modification of pain, through reflex arcs that operate at a local spinal level, is known as 'gate control' of pain.
- Vertebral joint dysfunction and associated muscle spasm can irritate these various elements of the nervous system through mechanisms of torsion, stretch and compression setting up sustained abnormal reflex activity.[33].

In some cases the results of this nerve interference will be obvious – where there is pain, or muscle spasm or weakness. However other results of importance to athletes are less apparent – minor spasm and restricted ranges of motion, loss of neuromusculoskeletal coordination, and interference with

Table 1

Biomechanics:	
Year 1 – Basic body mechanics (AC 101)	96 hrs
Year 2 – Spinal mechanics (AC 203)	42 hrs
Year 3 – Clinical biomechanics (AC 305)	100 hrs
	238 hrs

This is prior to clinical training is years 4 and 5. In addition other courses such as anatomy, physiology, neurology, chiropractic sciences, functional x-ray diagnosis, etc., are all within the context of normal/abnormal biomechanics and function.

Palpation and manipulative skills:	
Lectures/theory	
Year 1 (AC 101)	96 hrs
Year 2 (AC 203 and CP 202)	100 hrs
Year 3 (AC 305)	100 hrs
	296 hrs
Practical Skills	
Year 1 (AC 102)	100 hrs
Year 2 (AC 204)	145 hrs
Year 3 (AC 306)	145 hrs
Year 4 (CE 405)	808 hrs
	1,198 hrs

From 1989/90 Academic Calendar, Canadian Memorial Chiropractic College, Toronto Canada.

the ability of the nervous system to adapt and produce maximum benefit from training ('neural adaptation' as discussed above).

• Skilled biomechanical diagnosis and manipulative and other manual techniques allow this joint and muscle dysfunction to be assessed and corrected – ideally before continued training brings aggravation and injury.

20. Czech neurologist Karel Lewit MD D Sc, internationally respected by both the chiropractic and medical professions because of his systematic research and practice of manipulative therapy since the 1950s, emphasizes the importance of nerve control to correct spinal mechanics and explains:

• The quality of movement patterns varies from one individual to another;

• This variation is linked to spinal dysfunction;

• Dysfunction in "a single motor segment" – i.e. joint and associated muscles and nerve supply – "will have its repercussions throughout the body axis and must be compensated".

• In this "nerve control plays a decisive role".[31]

C. Sports Chiropractic

21. As already noted there is a broad scope to sports chiropractic education and practice (see para 3). The Director of Rehabilitation for Canada's premier professional soccer team, Toronto Blizzard, is a chiropractor (Robert Gringmuth DC) and spring sees him doing a Metrocom analysis of each player's functional status and supervising individually tailored conditioning programs.

But the central focus of education and practice, and the area in which a chiropractor brings unique training and skills to athletes and the sport medicine team, is the diagnosis and manipulative treatment of joint dysfunction and its effects. The spinal joints, because of their relative inaccessibility, require special skill. They are of paramount importance because of their interaction with the neurological system.

22. Chiropractic undergraduate education, whether in the university system (e.g. Australia, England) or private colleges (e.g. North America) is subject to internationally established standards of accreditation and is now similar in accredited colleges worldwide.

(See Table 1 for a summary of course hours in two relevant areas – biomechanics, and palpation (testing of joint and muscle function by hand) and manipulation. This serves to illustrate depth of training).

Postgraduate specialty courses in sports chiropractic vary between one year/100 hours (e.g. U.S.A. and Europe) and three years/300 hours (e.g. Canada).

Joint Dysfunction/Fixation

23. In assessing and treating individual joint dysfunctions and their effects throughout the linked neuromusculoskeletal system a chiropractor addresses:

a) Active (under voluntary muscle control) and passive (requiring external force, as in chiropractic motion palpation) ranges of motion in each joint.

b) In the three planes of joint motion – flexion/extension, lateral bending, and rotation.

c) Single and coupled movements.

d) The relationship between dysfunction in one joint and other joints.

e) The effects of muscular injury, spasm, weakness and imbalance on joint function, and vice versa.

f) The effects of general biomechanical fault (e.g. in postures) on joint function at specific levels.

g) The effects of joint and/or muscle dysfunction on the nervous system – whether evident as pain or other symptoms, or sub-clinical (e.g. reflex mechanisms of facilitation or inhibition, assessed through muscle tone or skin texture).

In summary chiropractic's interest in joint function is not linked simply to removal of pain and other frank symptoms – the primary concern is the wider issue of the full effects of lost range of joint movement on health and performance.

Goals of Treatment

Management of Pain

24. An athlete may experience pain in the neck, back or extremities which prevents training or competition but is not associated with any evident strain or sprain. The precise causes of much musculoskeletal pain, particularly in the spine, are often uncertain to everyone.

The chiropractic approach, after other underlying pathology has been ruled out, is to test for joint and muscle dysfunction and, where this is found, seek to restore normal motion through highly specific manipulative (adjustive) techniques and other procedures (e.g. manual soft tissue techniques for muscle trigger points). As already emphasized the whole locomotor (musculoskeletal) system is reviewed because there may be contributing dysfunctions at various joint levels.

It is probably fair to say that the growth of the chiropractic profession worldwide during this century has mainly been based upon the high success rate in relieving acute pain (i.e. pain of recent onset) by manipulation. Today there is a body of research[5,6,7,8,9,10] which supports the conclusion that skilled manipulation provides quicker relief from most acute musculoskeletal pain than any other treatment approach.

Management of Injury

25. In the case of a muscle strain or joint sprain, for example, chiropractic management combines conventional use of rest, physical therapy modalities and remedial exercise with manipulation for dysfunction. The key, again, is to consider the whole, linked, musculoskeletal system as one. Muscular strain in the upper body arising from altered mechanics may be caused primarily by a fixation and imbalance in the pelvis. This must be addressed for quick and lasting recovery.

26. Cibulka PT, Rose PT et al[35] compared two forms of treatment in a study of 20 patients with hamstring muscle energy and sacroiliac joint (pelvic) dysfunction:

• Group 1 (control – n 10) – moist heat and passive stretching. (Conventional treatment for this injury, assuming a cause of leg muscle strength imbalances).

• Group 2 (experimental – n 10) – the same, plus manipulation of the sacroiliac joint. (This treatment, based upon a wider view of biomechanical factors, also considered over-stretching of the hamstring muscle because of SI joint dysfunction and pelvic tilt).

The group receiving manipulation demonstrated significantly greater recovery of muscle function (flexibility and peak torque), and the authors suggest that this is because return to normal function of the pelvis restored the hamstring muscle's normal resting length.

Clinical experience in sports chiropractic is that athletes with hamstring muscle strain and SI joint dysfunction are able to regain muscle function and return to activity sooner where the SI joint problem is addressed.

Prevention of Injury

27. The study just discussed also illustrates the importance of prevention – a muscle stretched in response to fixation in an adjacent joint is clearly at greater risk of injury.

The goals of management are to find lost ranges of joint motion and muscle function before aggravation produces injury. This is why Joe Montana and his teammates are receiving chiropractic assessment and treatment before a football game (see para 1). Because of the biomechanical demands they place on their bodies, all athletes are at risk.

Lewit MD D Sc (see para 20), who agrees that manipulative therapy has the broad goal of maintaining function within the linked musculoskeletal system rather than the narrow goal of treatment of pain or injury, argues the importance of prevention – and identifies high-performance athletes as the population with the clearest need.[36]

Enhancement of Performance

28. Here the aims of chiropractic management, and maintaining free ranges of joint motion, include:

- Restoring joint play and muscle length where former inflammation from injury has left fibrosis/scar formation that is restricting range of motion – often quite unbeknown to the athlete, especially with spinal fixations – and thus limiting performance.
- Removal of joint interference with neuromuscular (nerve) control, thereby improving overall muscle coordination, strength and speed (see this Report, paras 18-20).
- Increasing efficiency of energy expenditure – because of the cumulative effect of joint dysfunctions on biomechanical efficiency (paras 16-17).

29. These aspects of sports chiropractic practice, of greatest significance to high-performance athletes, may today involve considerable sophistication. For example, in preparation for the Seoul Olympics the Canadian Swim Team's chiropractor Ken Mikkelson DC prepared stroke analyses for individual swimmers. This analyzed when and how mechanics altered as the swimmer tired during a training session, and provided an effective basis for joint and muscle review and treatment to provide more efficient stroke pattern throughout training sessions and competition.

It is only during the past 10 years that such services have been widely available to leading athletes. It is the experience of many, and organizations such as the U.S. Olympic Committee which serve them, that everyone benefits when chiropractic services are available within an integrated sports medicine team – the athlete, the coach, athletic therapists, MDs, PTs and, of course, the sports chiropractor himself/herself.

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