THERAPEUTIC TAPPING
FOR MUSCULOSKELETAL CONDITIONS

Maria Constantinou
Mark Brown
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In *Therapeutic Taping for Musculoskeletal Conditions*, Maria Constantinou and Mark Brown have produced a very comprehensive, practical and user-friendly text for clinicians and students from a range of disciplines. Physical therapists, athletic trainers, doctors, podiatrists, chiropractors, osteopaths and other musculoskeletal clinicians will find this book invaluable and one that will be used frequently in their practice — to gain new taping ideas, to refresh one’s memory of particular techniques and to understand the current evidence.

This is a very practical book with an easy-to-use format. The book is organised in a clear and logical manner. The first three chapters provide an overview of therapeutic taping, its principles and effects as well as precautions and preparation procedures. The remaining chapters are arranged according to the anatomical region, covering the upper body, lower body and spine. At each region, a range of techniques have been compiled including those aimed at restricting range, deloading soft tissues, facilitating or inhibiting muscle activity, providing stability and support, and relieving pain. Soft casting is also covered as an alternative to taping for patients who may require ongoing taping or who are sensitive to adhesive tape.

For each taping technique the authors present a short background and rationale for its use, research evidence if available, material required, patient and therapist position, a detailed step-by-step application procedure with photographs and the use of relevant outcome measures for evaluation of the technique. The accompanying DVD is a valuable asset, particularly for those more complex techniques, reinforcing the taping application descriptions in the text. A sample standardised patient information sheet specifically designed for musculoskeletal taping is included in Appendix 2, and is a clinical tool that can be utilised by therapists.

A strength of the book is its inclusion and discussion of the research evidence (or lack thereof) for each taping technique. This is done in a thorough yet concise and useful manner to facilitate its relevance for clinicians. Appendix 1 provides a detailed table of the methodology and results of individual studies for those who wish to have a greater understanding of the research evidence for musculoskeletal taping.

In all, this is a user-friendly text which will find an important place in the clinic or office of the musculoskeletal practitioner, to be consulted on a regular basis.

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THERAPEUTIC TAPING FOR MUSCULOSKELETAL CONDITIONS
WHAT IS THERAPEUTIC TAPING?

The Compact Oxford Dictionary (2009) defines ‘therapeutic’ as relating to the healing of disease, or having a good effect on the body or mind. Following this definition therapeutic taping techniques are techniques that utilise adhesive strapping tape as a component of the management of patients with musculoskeletal conditions.

The purpose of this book is to guide therapists on how to select and incorporate therapeutic taping techniques into clinical practice. Therapists have many clinical tools at their disposal and it is certainly not our contention that taping techniques are a panacea. However, they can be a useful component of the treatment for some musculoskeletal conditions.

Amongst other things, tape can be used clinically to reduce strain on damaged tissues, provide mechanical support to facilitate correct movement patterns, and facilitate or inhibit muscle activity. Used for these purposes, taping techniques can assist the therapist to address the underlying cause of a patient’s condition. Taping techniques are rarely used in isolation, rather they are usually utilised in conjunction with appropriate exercises or other manual therapy techniques. The actual effects of taping as a therapeutic tool will be further explored in Chapter 2.

Suggestions as to how the techniques can be utilised into clinical practice will be expanded upon under the description of each technique in Chapters 4, 5 and 6.

It should also be noted that as the book’s focus is on therapeutic taping techniques, taping techniques intended for the purpose of injury prevention are not specifically covered (there are many texts already on that subject), but they are included and discussed where the same techniques also have a therapeutic purpose. There is also a section in the literature review text in Chapter 2 that briefly examines the evidence in relation to the effectiveness of taping in injury prevention.

THE EVIDENCE-BASED APPROACH

The concept of utilising an evidence-based approach to clinical practice is now well established across most health professions. An aim of this book is to incorporate available evidence wherever possible while discussing the use of taping techniques for musculoskeletal conditions.
As stated by Hoffman, Bennett and Del Mar (2010), the purpose of evidence-based practice is to assist in clinical decision making and that for clinicians to be able to make informed clinical decisions many pieces of information need to be integrated. Herbert et al (2005) point out that high quality clinical research is not the only source of information that clinicians must take into account; rather, practice should also be informed by the professional knowledge of the therapist and, in addition, patient preferences.

Chapter 2 provides a summary of some of the available published evidence relating to the use of taping for musculoskeletal conditions. The main purpose of Chapter 2 is to provide the reader with an overview of some of the directions researchers have taken while trying to establish the effects and effectiveness of taping techniques as a treatment modality for musculoskeletal conditions. In this edition, we have not sought to undertake a comprehensive systematic review of the literature relating to taping. Rather, the purpose of the literature review is to inform clinicians as to the available evidence about some of the possible mechanisms that cause tape to be a useful clinical tool. With this information clinicians may be better able to adapt and incorporate the techniques to the specific needs of the patient, rather than follow a recipe approach to treatment.

Where research evidence for a technique exists, this will be discussed in the background and rationale section of each technique in Chapters 4, 5, 6 and 7.

The quality of research relating to taping varies widely. There are various systems describing levels of scientific evidence. Where appropriate, reference to levels of evidence discussed in this book is based on an adaptation of the classification system from the Australian National Health and Medical Research Council (NHMRC) (http://www.nhmrc.gov.au/index.htm), which is described in Table 1.1.

**Table 1.1 Levels of Evidence (National Health and Medical Research Council)**

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Study Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Evidence obtained from a systematic review of all relevant randomised controlled trials.</td>
</tr>
<tr>
<td>II</td>
<td>Evidence obtained from at least one properly designed randomised controlled trial.</td>
</tr>
<tr>
<td>III-1</td>
<td>Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).</td>
</tr>
<tr>
<td>III-2</td>
<td>Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.</td>
</tr>
<tr>
<td>III-3</td>
<td>Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group.</td>
</tr>
<tr>
<td>IV</td>
<td>Evidence obtained from case series, either post test or pre-test/post test.</td>
</tr>
</tbody>
</table>

Clinical or case reports are not part of the NHMRC levels of evidence classification system. However, in the absence of higher levels of evidence, clinical decision making may be based on clinical or case reports. These are described in some classification systems such as the Oxford Centre for Evidence Based Medicine (CEBM) levels of evidence as Level V (http://www.cebm.net/index.aspx?o=1025, accessed 29 March 2010). When discussing clinical or case reports in context of the therapeutic taping
techniques described in this book they will be referred to as either clinical or case reports.

Given the varying quality of, or in some cases the lack of, published scientific research for some of the taping techniques, the use of appropriate outcome measures which can provide the patient and therapist with a clear indication of the effectiveness of the technique are necessary. Outcome measures can also assist the therapist to make evidence-based informed decisions, including in determining the effectiveness of modified or innovative techniques that in their professional judgment may be more appropriate for a particular patient or types of patient.

OUTCOME MEASURES USED IN CLINICAL PRACTICE PERTAINING TO TAPING

Appropriate outcome measures, which are tests or scales used to measure function or performance of patients at a point in time, are a necessity in patient management in any healthcare setting. Measures of outcomes can also be used to evaluate change of the patient’s condition or function over time, by looking at the difference from one point in time (before an intervention or at the initial assessment session) to another point in time (following an intervention or at a follow-up assessment session). Outcome measures utilised in a musculoskeletal clinical setting can be of subjective nature, they may include measures of objective or functional tests, or the use of validated questionnaires specific to the patient’s condition, presentation or goals. Discussion and critical evaluation of different outcome measures used in a musculoskeletal clinical setting is a stand-alone topic and it is beyond the scope of this book. However, it is important throughout this book that the reader considers the use of outcome measures to evaluate the indication and efficacy of therapeutic taping techniques.

The subjective examination or history taking is an integral part of the patient consultation process and gives the therapist an insight into the description, behaviour and intensity of the patient’s symptoms, functional limitations and goals of treatment. This information contributes to the clinical reasoning process and assists in developing an effective patient-centred management approach, which includes use of relevant and specific outcome measures. Identified relevant outcome measures may be used before and/or after the application of therapeutic techniques, including taping, to evaluate the indication and efficacy of each technique.

The most common clinical outcome measures referred to in this book in the evaluation of therapeutic taping techniques are:

1. Pain free active range of motion (ROM) is a commonly used outcome measure in musculoskeletal assessment and can be measured using various goniometric methods. Some commonly used goniometric tools are described below.
   a. A standard goniometer can be used to measure ROM in most joints in the body. The goniometer has been shown to have a good intratester reliability within 2°–3° and fair to good intertester reliability within 5°–6° (Rothstein, Miller & Roettger 1983). Goniometric measurements of ROM have been studied in a variety of body regions and have been found to be reliable within a 2°–5° range (Edgar et al 2009).
   b. A fluid filled plurimeter measures ROM in certain body regions. A plurimeter is an instrument with incremental markings on a dial that rotates to measure the angle ROM of one body area relative to another. A plurimeter can be used as an alternative to a goniometer, as for instance, in the measure of hip internal and external rotation (Croft et al 1996) or in cervical spine flexion and extension.
   c. An inclinometer is a mechanical or electronic device which measures the relative inclination of a body area with respect
to gravity. Generally two sensors are required to be used concurrently, one of which is stationary and the other is attached to the moving body part and records the reference of one point to the other. An example of the use of an inclinometer is in the measurement of cervical spine flexion ROM (Antonaci et al. 2000) or lumbar spine ROM (Chen et al. 1997).

d A standard soft tape measure may be used when measuring ROM in certain body areas, such as the lumbar spine (Fitzgerald et al. 1983).

2 There are three main pain rating scales commonly used to evaluate the perception of pain.

a The visual analogue scale (VAS) which uses a 10 cm blank line (Fig. 1.1). The patient is asked to record their pain level on the line where one end is indicative of ‘no pain at all’ and the other end is indicative of the ‘worst imaginable pain’. This scale needs to be delivered in a written format and consistency in its delivery – to being in either a horizontal or a vertical line – is necessary (Williamson & Hoggart 2005), with the horizontal line being most commonly used. The clinically significant change is thought to be at 30–33% difference in the pain rate (Williamson & Hoggart 2005).

b The numerical rating scale (Fig. 1.2) requires the patient to record their pain level by circling a number from 0–10 on a 10 cm line with 1 cm increments from zero (0) ‘no pain at all’ to ten (10) ‘worst imaginable pain’. This scale can be delivered verbally or in a written format (Williamson & Hoggart 2005). A reduction of two points or 30% change is considered a clinically meaningful change (Farrar et al. 2001).

c The verbal rating scale is a process whereby the patient is asked to describe their pain level on a list of incremental adjectives such as, for instance, ‘no pain; mild pain; moderate pain; and severe or intense pain’ which are assigned a numerical value from 0–3 (Williamson & Hoggart 2005).

All three pain rating scales have been found to be valid clinical measures, particularly when used within the same patient comparison (Maxwell 1978; Williamson & Hoggart 2005). It is important to note that the use of these scales can be applied by the patient when describing the intensity of their pain at rest, and/or during active ROM, or during a nominated functional task. For instance, the pain level on the lateral hip area may be rated by the patient during rest, during active hip

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No pain at all ____________________________ Worst pain imaginable

FIGURE 1.1 THE VISUAL ANALOGUE SCALE (VAS)

0_____1_____2_____3_____4_____5_____6_____7_____8_____9_____10
No pain Worst imaginable pain

FIGURE 1.2 THE NUMERICAL RATING SCALE
flexion and then compared during walking and during stair climbing, before and after the use of a hip application taping technique.

3 The patient specific functional scale (PSFS) requires that the therapist asks the patient during the subjective or history taking session ‘Today, are there any activities that you are unable to do or having difficulty with because of your [nominated] problem?’ (Sterling & Brentnall 2007). The patient is asked to nominate three main activities they have difficulty performing and to rate each of these activities on an 11-point scale (0–10), where zero (0) is ‘Unable to perform activity at all’ and ten (10) is ‘Able to perform activity at the pre-injury or problem level’ (Westaway, Stratford & Binkley 1998). This scale has the capacity to measure change over time and has been shown to have a minimal detectable change value of two points when the average score of the three activities is used and three points for each single activity score. The validity and sensitivity of the PSFS change has been demonstrated in several musculoskeletal conditions such as cervical radiculopathy (Cleland et al 2006), neck (Westaway et al 1998) and low back pain (Pengel, Refshauge & Maher 2004), in patients with knee pain (Chatman et al 1997) and in functional limitation of patients with work-related injuries (Gross, Battie & Asante 2008). The PSFS is available in a simple form which is easy to apply and is available at the time of writing on the Transit Accident Commission of Victoria website, accessed through: http://www.workcover.vic.gov.au/wps/wcm/resources/file/eb5b3b42810d1fd/patient_specific.pdf

When making an informed decision regarding the therapeutic effect of a taping technique the therapist needs to be aware what change constitutes a minimum detectable difference. In the application of taping, a clinical change commonly employed by therapists is improvement of 50% or better in the symptoms being addressed with tape (McConnell 2002; Vicenzino et al 2008). This is supported by Farrar et al (2001) who found a change of 50% or more in the numerical scale could represent a ‘very much improved’ verbal rating. However, as suggested by Rowbotham (2001) in his editorial ‘What is a “clinically meaningful” reduction in pain’, a value of 30% reduction in numerical rating could represent a ‘much improved’ verbal rating and it could be regarded as a meaningful clinical improvement.

ANATOMY KNOWLEDGE
Excellent knowledge of anatomy of the area to be taped is imperative to the success of the technique and the safety of the patient. An assumed level of anatomy knowledge by the therapist is expected in the application of the techniques described in this book. If uncertain, the therapist needs to ensure they review the anatomical details of the area to be taped in preparation. It is beyond the scope of this book to provide a detailed anatomical description of each area to be taped, but it is hoped that a comprehensive musculoskeletal anatomy book may be utilised as a reference where necessary during the application of taping.

TERMS AND DEFINITIONS
This book aims to have a consistent language approach used throughout. It is important for the reader to be aware that, unless otherwise stated, throughout this book the following applies:

1 All references to athletes, patients and clients are confined to the use of the word ‘patient’.

2 All references to the physical therapist, physiotherapist, athletic trainer and other clinicians are confined to the use of the word ‘therapist’.
CHAPTER 1 • INTRODUCTION TO THERAPEUTIC TAPING

3 The word ‘tape’ or ‘taping’ will be used to refer to 38 mm width adhesive rigid tape, which is considered to be the most commonly used tape (Bragg et al 2002).

4 The word ‘hypoallergenic underlay’ will be used to refer to tape that is hypoallergenic, perforated, and elastic in its width but not length. In this book 5 cm width hypoallergenic underlay is used.

5 The use of the term ‘range of motion’ will be abbreviated as ROM.

6 The use of the word ‘centimetre’ will be confined to the common abbreviation ‘cm’.

7 The use of the term ‘lumbrical grip’ will be used to refer to the therapist’s position of metacarpophalangeal flexion of fingers 1 up to 4 (which use the lumbrical muscle action) and the thumb position of carpometacarpal adduction and metacarpophalangeal flexion, as the thumb and fingers come together to grip during the application of a manual therapy technique.

The reader should also consider the following important points during the application of the therapeutic taping techniques.

1 The use of hypoallergenic underlay will be described where it is an integral part of the technique. However, its use is not limited to those techniques alone and the therapist may opt to use it with other techniques.

2 The use of elasticised adhesive bandage may be used over taping techniques to reinforce the application of tape if desired, or if the patient plans to perform vigorous activities after the application of the taping technique.

3 An explanation should be given to the patient describing the purpose of each technique, and informed consent should be gained each time the technique is applied.

4 A standard warning regarding taping precautions is described in Chapter 3, and this should be given after each tape application. When a more specific warning is relevant to a particular technique, over and above the standard warning described in Chapter 3, it will be included at the end of each technique.

5 After the application of each taping technique an evaluation of the effectiveness of the technique needs to be performed using appropriate outcome measures. Some possible outcome measures are described at the completion of each taping technique. However, these are only a guide and the therapist may choose to use other specific outcomes relevant to the patient and/or condition being treated.

HOW THIS BOOK IS STRUCTURED

This book is structured so that the reader reviews Chapters 1–3 to gain the relevant background information that relates to the use of taping as a therapeutic tool prior to reading Chapters 4–6, which relate to the application of therapeutic taping techniques to specific body regions. Chapter 7 describes a sampler of soft casting techniques which can be used in place of taping for certain patients who require ongoing taping and/or are sensitive to the adhesive material used in the manufacture of taping. Each taping technique described in Chapters 4–7 is a stand-alone technique starting on a separate page and includes background and rationale for its use, material required, patient and therapist position, step-by-step application procedures with photographs and the use of relevant outcome measures for evaluation of the technique. The therapist, whether a student or an experienced clinician, is able to utilise as much or as little of the information provided for each taping technique to apply the technique effectively.
The structure of the book is as follows:

**Chapter 1 • Introduction**
This chapter introduces therapeutic taping and provides an overview of the approach the book will take, including how the evidence is discussed, the use of outcome measures in the application of taping and common terms and definitions employed throughout the book.

**Chapter 2 • Review of the principles and effects**
Chapter 2 reviews available evidence in the literature on the use of taping, and discusses the general effects of taping for musculoskeletal conditions.

**Chapter 3 • Precautions and preparation procedures**
The general and specific precautions and contraindications to taping are discussed in this chapter. Furthermore, this chapter outlines the general procedures for preparation of taping and the necessity of gaining informed consent prior to, and providing a precautionary warning after, the application of the taping technique.

**Chapter 4 • Taping for musculoskeletal conditions of the upper body**
Chapter 4 describes the application of taping techniques to the upper quadrant, which include scapula and postural taping, taping to the glenohumeral, acromioclavicular, elbow and wrist joints, and taping to the hand and fingers.

**Chapter 5 • Taping for musculoskeletal conditions of the lower body**
Chapter 5 describes the application of taping techniques to the lower quadrant, which include the hip, knee, tibiofibular and ankle joints and taping to the foot and toes.

**Chapter 6 • Spinal conditions of cervical, thoracic and lumbar spine, pelvis and sacroiliac joint (SIJ)**
Chapter 6 describes the application of taping techniques to the cervical, thoracic and lumbar spine, and to the pelvis and sacroiliac joints.

**Chapter 7 • Soft casting techniques**
Chapter 7 provides a sample of three soft casting techniques which can be used as an alternative to taping for patients who may require ongoing taping or who may develop, or are sensitive to, the adhesive material on tape. The techniques described in Chapter 7 are for soft casting to the thumb, ankle and foot.

**Appendices**
Appendix I contains a summary table of the most relevant research evidence relating to techniques described in this book. Appendix II contains a sample standardised patient information sheet, with warning and consent forms that may be utilised by therapists when using the therapeutic taping techniques described in this book.
REFERENCES


