

Functional Fascial Taping

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The Functional Fascial Taping (FFT®) method is an innovative way to apply rigid strapping tape that can immediately decrease pain and increase range of motion. It is effective in most musculoskeletal pathologies and is believed to encourage muscle firing to promote and restore normal movement patterns. FFT® is therefore used to treat a wide range of musculoskeletal conditions from sports injuries to back pain and even arthritis.

Rigid strapping tape has been used for many years in the treatment of musculoskeletal conditions and during the rehabilitation process⁽¹⁾. In the acute stage the main aim is to reduce pain and swelling, by providing protection and support thereby encouraging proprioception and the restriction of joint range. Taping is used widely in the management of patellofemoral pain syndrome⁽²⁾ although its proposed mode of action remains questionable⁽³⁾. What has been consistently demonstrated is the ability of taping to alter the pain response in presenting patients. The reduction in pain encourages the patient to exercise and allow these movements to be performed in a pain free environment.

Some of the potential mechanism effects from tape have been highlighted by scientific investigation. Research into tape has shown effects on motor synchronisation⁽⁴⁾, proprioception⁽⁵⁾, biomechanics⁽⁶⁾, load⁽⁷⁾ and pain⁽⁸⁾. However more research is needed as the exact mechanism remains unclear^(4,6).

Conventional taping has been used within the sporting world for decades. I served as the principal sports soft tissue therapist at the Australian Ballet for 8 years. Recent studies have demonstrated a high incidence of musculoskeletal injuries within the dance population, with over 75% of dancers reporting an injury during the 19 week trial period, with the majority of these confined to the foot or ankle⁽⁹⁾. The impetus to experiment with treatments arose due to the fast paced environment where the desire of the dancers was to maintain a 55 hr p/w rehearsal and performance schedule; flexibility of movement and to return to performance as soon as possible after injury. This combined with a willingness of the dancers to

try new approaches, provided the basis for the development of a new way to modify and control pain, when traditional methods were not always effective.

FFT® is a specialized method of applying tape which was developed on elite dancers to allow for continual training and performance. FFT® has been reported as clinically efficacious in many pain conditions including the management of plantar fasciitis, anterior impingement of the ankle, neuromas (case study 1), osteoarthritis of the knee, low back pain (case study 2), muscle strains, groin pain, shoulder impingement, headaches, tennis elbow and carpal tunnel syndrome. Moreover, the effect of FFT® on a Morton's Neuroma has been investigated in a research paper for a Masters of Osteopathy, case report demonstrating immediate relief of pain, and disability. These outcomes were maintained at follow up⁽¹⁰⁾. The tape in conjunction with rehabilitative exercises have shortened the time it takes for the return to normal function as times can be reduced significantly and have frequently prevented the need for surgery. In conjunction with the normal assessment and treatment procedures, it was observed that directional specific digital pressure applied over a painful area could alter the pain response. This is termed digital distraction whereby the immediate change in pain is realized after identifying the direction of pain relief, followed by taping in this direction. This alteration facilitated an increase in pain free range and improved muscle function. This can be used for instances of acute injuries however it is especially used for sub-acute and chronic injuries. These, often notable gains could be maintained by the application of tape using a specific gathering technique allowing the patient to rehabilitate appropriately and return to function earlier. With time it became apparent that this had application in virtually any musculoskeletal condition and has been used in most sports with surprising results.

So how does it work?

The idea of off loading tissue is not new. The difference lies in the specificity of tape application in terms of technique, direction sequence, amount of

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load and the width of tape used. The underpinning factor in its application is in its sound clinical reasoning premise of test, intervene and retest.

The theory underlying the action of tape has been questioned within the medical literature⁽³⁾. It is my belief that interfaces between connective tissue and the neurological system provides a clue. The ultimate connectivity of the fascial system throughout the body has been repeatedly demonstrated^(10, 11, 12). This in conjunction with anecdotal evidence of the influence of local structures on the function of distant areas⁽¹⁰⁾. This alteration in load, in conjunction with the directional specificity can create an immediate change in pain and may provide afferent receptor activity from the influence from the interface of connective tissue and the neurological system. FFT® may modify the transmission of pain from influencing nociceptor activation. This possibly happens via the taping methods' action on the 'connective tissue which is rich in nociceptors'⁽¹¹⁾.

The assessment procedure Digital Distraction (D.D) tests the local tissue in various positions to identify the direction/s that reduces pain. It is hypothesized the DD may offer de-compressive force when symptoms are relieved and a compressive force when symptoms are made worse. The outcome of instant reduced pain and increased range suggests both neurological and mechanical effects occurring, however the positive effect is realized after identifying the direction for tape by observing pain and range changes. This suggests nociceptor deactivation potentially via an unloading effect of the nociceptor from within the connective tissue. Additionally it is possible that the unloading effect of the nociceptor from within the connective tissue assists in 'drainage' and improved circulation to the area. This is possibly diluting or clearing inflammatory chemicals that activate nociception. It's possible the tape may stimulate large numbers of afferent receptors, this input may flood in and over load the gate, thereby closing the gate. The presence of the tape on the body has the potential to act as a mechanical stimuli thereby activating large diameter nerve fibres. Based on the 'gate control theory' of pain. Thus we see a multidimensional impact of FFT® potentially has on nociceptor 'de-activation'.

In response to injury, the body lays down Type III collagen to return structural integrity to the area. With time this is converted to Type I collagen, however the structural alignment of the repaired tissue is altered from that of the original. Whilst locally applied soft tissue mobilisations⁽¹³⁾ prove an extremely useful treatment modality, the benefit can

be temporary, with the unloaded state being present the majority of the time. It is theorised that by applying tape using the FFT® method, the process may offer a continual proprioceptive input and a sustained stretch which is thought to influence both structure and function of the local fascial tissue due to the nature of fascia being 'malleable and viscoelastic structure that is responsive to load and capable of producing pain'^(7, 14, 15, 16).

Whilst the method is currently undergoing a randomised controlled trial in Australia, previous real time ultrasound data demonstrates an alteration in subcutaneous tissue layer, including the fascia one centimeter in the direction of the tape. The deep fascia and the musculature are moved in the opposite direction by one centimeter, at a depth of 3 cm's. The quality of muscle contraction post application is also changed⁽¹⁷⁾.

How is it applied?

Conventional taping uses a non stretch tape and is normally applied with minimal to moderate tension with the common aim of restricting ROM. FFT® is used following a local examination and then in the actual painful range the intension is to elicit the optimal relieving digital pressure which allows the patient to gain further pain free range to the chosen area. The latter point is important, the reduction in pain is a primary aim of the technique and a degree of searching is necessary although common patterns can exist in some areas. Once this has been determined, the tape is applied with a gathering technique to reduce symptoms. Movement is reassessed throughout and the techniques adjusted. Further applications of tape in different directions may be needed to gain maximum effect, each vector of load is marked to allow easy reapplication of tape, the patient or a guardian is taught how to do this, along with appropriate warnings. Other aspects of the treatment for example manual therapy can be applied before or after taping and rehabilitative exercises taught.

Tape can be tightened daily it is then removed after a few days and re-applied to prevent skin irritation. Normally safety screening procedures are used when applying FFT® as would be used when using conventional taping (Table 1). If irritation is elicited the tape is removed until this has subsided and an appropriate hypoallergenic protective film e.g. Protective Film (Coloplast) used.

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Table 1. Safety screening procedures

Allergic reactions to tape/sensitive skin
Red hair, fair skin
Soft skin, everyone
Damaged or broken skin
Thin skin (elastic tape)
Sunburn
Undiagnosed pathologies
Conditions getting worse or not improving

At reassessment the movement is checked and the best direction of taping elicited through functional testing, tape is then applied using the gathering technique.

In about 10% of patients, an ache is reported or symptoms distal or proximal to the original may become apparent. These frequently settle within 24 hours. If not the patient is advised to loosen the tape until these symptoms settle and then to reapply.

As symptoms improve the need for taping reduces with patients commonly needing taping for up to 3 weeks before discontinuing the tape. However, this may be required for longer and the key factor here is, if the area is accessible, patients can self tape or a partner can be taught.



Summary

Like many therapeutic interventions, FFT[®] has been developed through clinical observation and experimentation. It has a wealth of anecdotal evidence to support its widespread use and is currently subject to a randomised controlled trial in chronic low back pain patients. It provides an easily applied medium for musculoskeletal conditions by

which pain free range can be gained quickly allowing appropriate and effective rehabilitation to be conducted. FFT[®] has wide application which produces quick and sometimes dramatic improvements in range and reduction in pain. Further research studies will help clarify its method of action and enhance even further the clinical benefits it offers.

Case Study 1

An elite classical ballet dancer presented with pain in two interdigit nerves in her left foot which had been present for 6 months. Firstly, between the 3rd and 4th metatarsals while on pointe (on toes in hardened shoes), which was aggravated by compression the forefoot and secondly, between the 1st and 2nd metatarsals while walking through the foot in the push off phase of gait and when rising to demi-pointe (standing on the balls of feet).

Previous treatment consisted of mobilisations, neural stretching, plantar surface padding, soft tissue work to the local area, planter fascia, tibialis anterior, and the calf. Theraband and intrinsic exercises were also suggested. The dancer's pointe shoe size was increased to help relieve compression of the forefoot. She was advised to do barre (warm up) in flat ballet shoes. Rest times helped and she continued to dance over an 8 month period with modification to her workload.

At 8 months the dancer presented claiming her pain had been a lot worse over the previous 2 weeks. She was referred to the sports medicine physician and MRI scan was recommended. The following day MRI was performed and the conclusion was appearances typical of neuromas in 1st and 3rd intermetatarsal spaces (see Fig 2a, 2b). It was recommended she have 8 weeks off and then reassessed with view to surgery if the condition had not improved. The following day the dancer was systematically assessed to determine if suitable for FFT[®]. The tape was applied according to the identified range, direction of optimal functional release and the tape was applied with a gathering technique. This created a pain free environment for the dancer to rehearse that day and during the subsequent weeks. FFT[®] tape was applied for the following 10 days with no other treatment performed. The dancer was followed up at 2 month intervals for 3 years with no neuroma pain present, able to sustain muscle contraction and was fully functional in all activities (Alexander '98).

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Figure 2a. (Left) MRI images typical appearances of Neuroma's between 1st and 2nd metatarsals ; and Figure 2b. (Right) Morton's Neuroma between 3rd and 4th metatarsals (Alexander R 1998. *Proceedings. The Australian Conference of Science and Medicine in Sport. Adelaide Convention Centre Australia. Addendum p1.*)

Case Study 2

A Patient with chronic lower back pain. Patient had symptoms for 14 years with past history of a decompression and discectomy (L4 and L5) for back and leg pain. Despite this, she had persistent pain and restricted range of trunk flexion (0° - 15°). Other treatments had not improved her symptoms. FFT® was applied and from the first treatment resulted in an immediate reduction in pain and an increase in range of movement (ROM). Graded increments in ROM took place over the subsequent visits with graduated flexion exercises to perform regularly at home. She received five FFT® treatments to modify the tape as needed. Clinical Pilates was commenced at three weeks. Patient was discharged at six weeks with full flexion ROM, and at follow up at six months and three years, the patient remained pain free, able demonstrate muscle strength and fully functional.



Picture is shown 1 week after applying FFT.

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