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REVIEW ON EFFECTS OF KINESIO TAPING ON BELL'S PALSY.

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Background

Bell's palsy, named after the Scottish anatomist, Sir Charles Bell, is the most common acute mono-neuropathy, or disorder affecting a single nerve, and is the most common diagnosis associated with facial nerve weakness/paralysis. Bell's palsy is a rapid unilateral facial nerve paresis (weakness) or paralysis (complete loss of movement) of unknown cause. The condition leads to the partial or complete inability to voluntarily move facial muscles on the affected side of the face. Although typically self-limited, the facial paresis/paralysis that occurs in Bell's palsy may cause significant temporary oral incompetence and an inability to close the eyelid, leading to potential eye injury [1].

Bell's palsy enter the health care system with facial paresis/paralysis as a primary complaint, not all patients with facial paresis/paralysis have Bell's palsy. It is a concern that patients with alternative underlying etiologies may be misdiagnosed or have unnecessary delay in diagnosis. All of these quality concerns provide an important opportunity for improvement in the diagnosis and management of patients with Bell's palsy [1].

The most common causes of the abrupt onset of unilateral facial weakness are stroke and Bell's palsy. The patient's history and neurologic examination will determine whether facial weakness is central or peripheral. If weakness is central, brain magnetic resonance imaging (MRI) is required to evaluate the patient for ischemia and for infectious and inflammatory diseases. Other tests — such as examination of the cerebrospinal fluid, sedimentation rate, and glucose level; a blood count; and serologic studies to identify syphilis, the human immunodeficiency virus (HIV), and vasculitis — may be necessary [2].

When evaluating a patient with facial weakness/paralysis for Bell's palsy, the following should be considered:

 Bell's palsy is rapid in onset (\72 hours).

 Bell's palsy is diagnosed when no other medical etiology is identified as a cause of the facial weakness

 Bilateral Bell's palsy is rare.

 Currently, no cause for Bell's palsy has been identified.

 Other conditions may cause facial paralysis, including stroke, brain tumors, tumors of the parotid gland or infratemporal fossa, cancer involving the

facial nerve, and systemic and infectious diseases, including zoster, sarcoidosis, and Lyme disease

 Bell's palsy is typically self-limited.

 Bell's palsy may occur in men, women, and children but is more common in those 15 to 45 years old; those with diabetes, upper respiratory ailments, or compromised immune systems; or during pregnancy [1].

INCIDENCE OF BELL'S PALSY

The incidence of Bell's palsy is 20 to 30 cases per 100,000 people per year. It accounts for 60 to 75 percent of all cases of unilateral facial paralysis. The sexes are affected equally. The median age at onset is 40 years, but the disease may occur at any age. The incidence is lowest in children under 10 years old, increases from the ages of 10 to 29, remains stable at the ages of 30 to 69, and is highest in people over the age of 70. The left and right sides of the face are involved with equal frequency. Most patients recover completely, although some have permanent disfiguring facial weakness is peripheral, no apparent cause will be found in most instances (in the case of Bell's palsy) [2].

RELEVANCE ANATOMY

The human facial nerve is the seventh cranial nerve (CNVII) and comprises motor, sensory and parasympathetic components. Its function is responsible for voluntary and mimetic facial movement, taste to the anterior two-thirds of the tongue, and control of salivary gland and lacrimal gland secretions [3].

The facial nerve receives axons from the superior part of the solitary nucleus and superior salivary nucleus that form the nervus intermedius component (sensory and parasympathetic axons) and motor efferent fibres from the facial nucleus, which receives synaptic input from the contralateral motor cortex for all facial movements except the forehead, which has bicortical input [3].

The path of the facial nerve has intracranial, intratemporal and extratemporal components. Its intracranial course runs from the pontomedullary angle to the internal acoustic meatus where it is accompanied by the vestibulocochlear nerve (CNVIII). The intratemporal course of the facial nerve is long and tortuous. During its intratemporal course, the nerve encounters the geniculate ganglion and gives rise to the superior petrosal nerve, the nerve to stapedius and chorda tympani nerve branches, before exiting the skull base through the styloid foramen [3].

The extratemporal facial nerve courses through the substance of parotid gland dividing it into deep and superficial lobes. It gives off the posterior auricular nerve and nerve to the posterior belly of digastric before dividing into its terminal facial branches. There is significant variation in the branching pattern of the terminal facial branches, which are traditionally conceptualised into temporal, zygomatic, buccal, marginal mandibular and cervical branches. These terminal motor branches are responsible for all facial expression and functional tasks such as eye and mouth closure and nasal patency during inspiration. Throughout its course, the facial nerve forms multiple communications between its own branches and with adjacent cranial nerves [3]

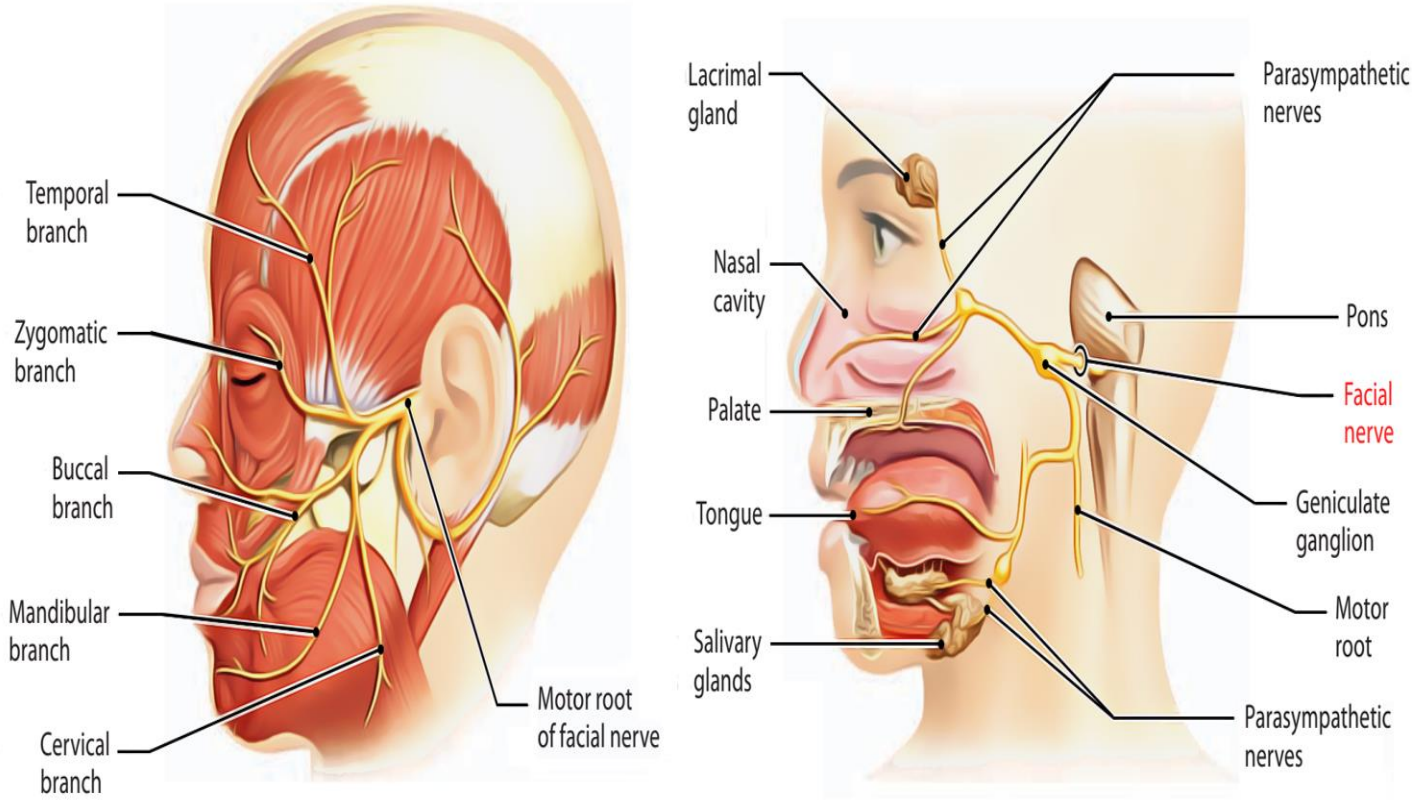


Figure 1. Facial nerves and course [5]

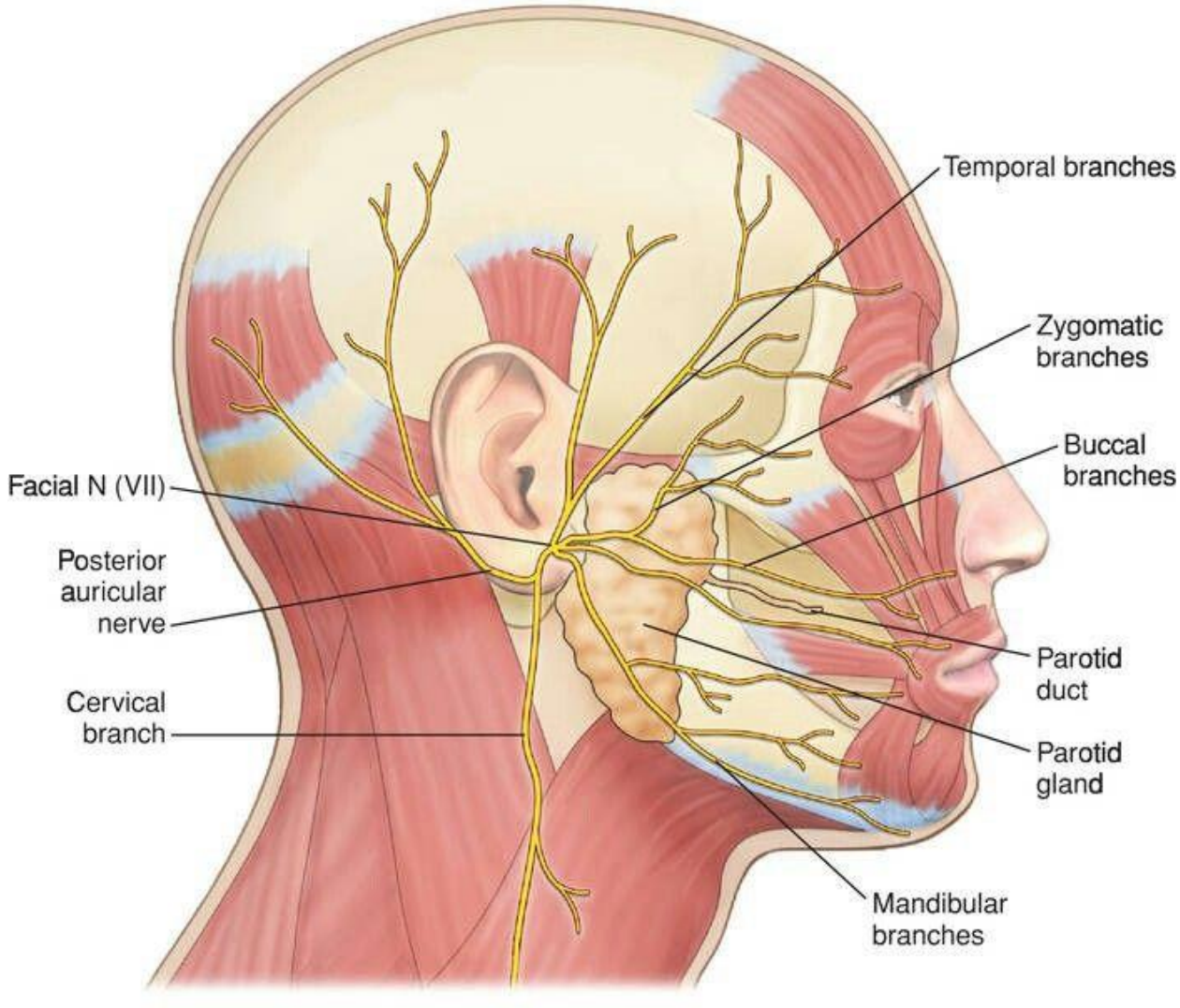


Figure 2. Overview of Components of Facial Nerves [4]

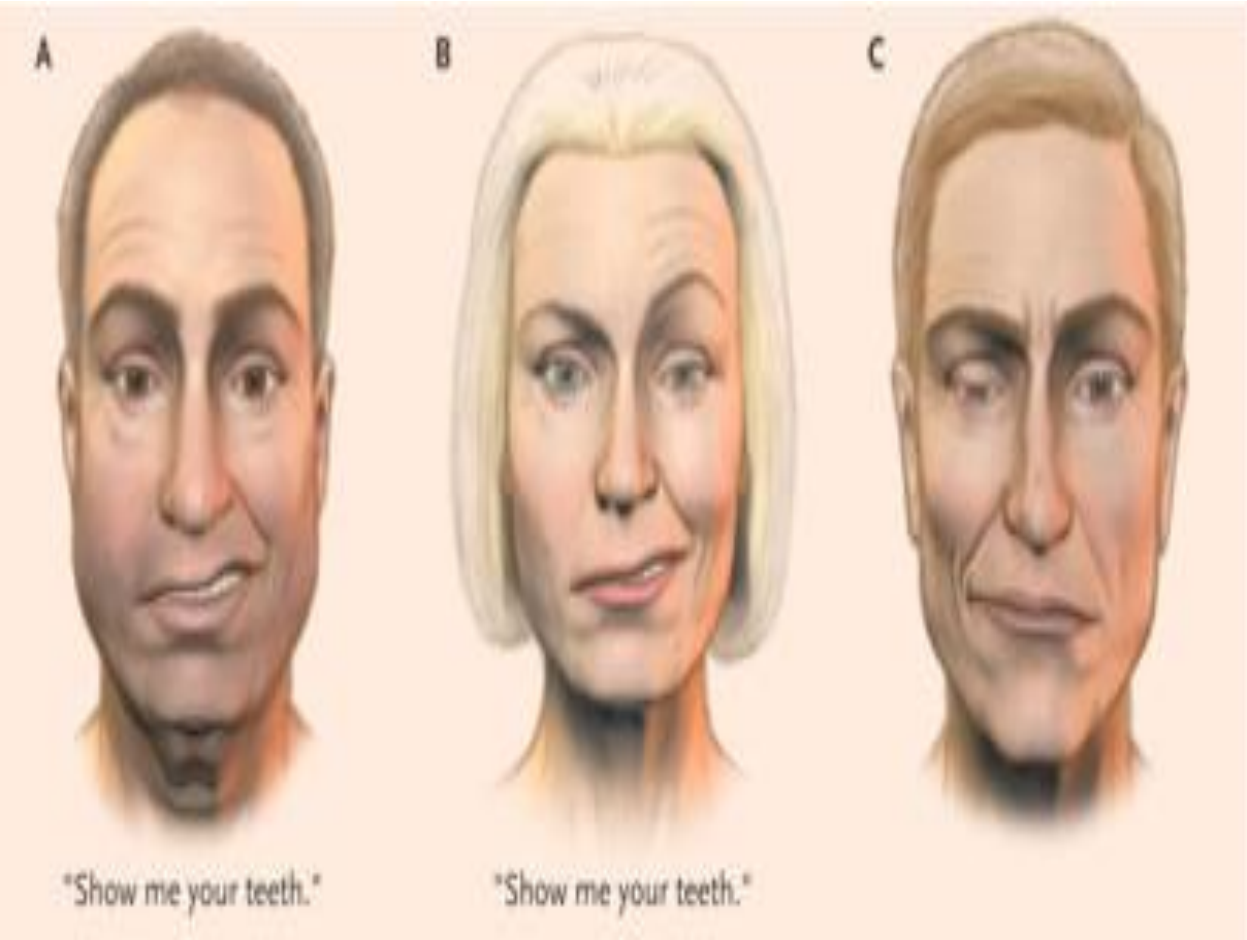


Figure 3. Central and Peripheral Facial Weakness

ETIOLOGY OF BELL'S PALSY

There is a diverse body of evidence implicating immune, infective and ischaemic mechanisms as potential contributors to the development of Bell's palsy, but the cause of classical Bell's palsy remains unclear. One possible cause that has been suggested is that of a reactivated herpes simplex virus (HSV-1) infection ycentered around the geniculate ganglion, a theory first outlined by McCormick. The association with HSV-1 is supported by the presence of HSV-1 in intratemporal facial nerve endoneural fluid harvested during nerve decompression, and the ability to incite facial palsy in an animal model through primary infection and reactivation induced by immune modulation [3].

HSV-1 is one of several human herpes viruses known to have a neurotrophic capacity for peripheral nerves, and other viruses in this category include herpes simplex virus type 2 (HSV-2) and varicella zoster virus (VZV). They enter the body through mucocutaneous exposure and establish their presence neuroaxis for the entire life of the host, including in the cranial, dorsal root and autonomic ganglia in latent form with highly restricted gene transcription in multiple ganglia [6].

Another possible contributor to the pathogenesis of Bell's palsy implicates the role of a cell-mediated immune response against myelin, akin to a mononeuropathic form of Guillain-Barré syndrome

(GBS). The evidence for this stems from the indirect laboratory finding of GBS, such as changes in peripheral blood percentages of T and B lymphocytes, elevated chemokine concentrations and in vitro reactivity to myelin protein (P1L) in blood samples taken from patients with Bell's palsy [7].

REVIEV OF LITERATURE

INTRODUCTION

Bell's palsy is an idiopathic, acute, peripheral palsy that involves the facial nerve supplying the muscles of facial expression. Bell's palsy is responsible for about 80% of all facial mononeuropathies and affects 11–40 individuals per 100,000 each year. The cause of Bell's palsy is believed to be inflammation of the facial nerve at the geniculate ganglion, but the cause of the inflammatory process itself remains uncertain. Increasing evidence implicates a role for the reactivation of latent herpes viruses from cranial nerve ganglia. [8]

Bell's palsy typically presents with a sudden and rapid onset of unilateral facial weakness, often within a few hours. Other symptoms include impaired ipsilateral movement of the affected side of the face, drooping of the eyebrow and corner of the mouth, and the loss of the ipsilateral nasolabial fold. Patients may also complain of ipsilateral earache, as well as numbness of the face. The most widely used and accepted clinical tool for documenting the degree of facial paralysis and for estimating recovery level is the modified House-Brackmann scale. The grading is from 1 to 6, with the latter being total paralysis. [8].

CLINICAL SYMPTOMS OF BELL'S PALSY

Paralysis of the muscles supplied by the Facial Nerve presents on the affected side of the face as follows:

- Inability to close the eye
- Inability to move the lips e.g In to a smile, pucker
- At rest, the affected side of the face may "droop"
- The lower eyelid may drop and turn outward - "ectropion" [4]

Functional Effects:

- Difficulty eating and drinking as lack of lip seal makes it difficult to keep fluids and food in the oral cavity
- Reduced clarity of speech as the "labial consonents" (ie. b, p, m, v, f) all require lip seal
- Dryness of the affected eye [4].

Somatic Effects:

The facial nerve supplies the lachrymal glands of the eye, the saliva glands, and to the muscle of the stirrup bone in the middle ear (the stapes). It also transmits taste from the anterior 2/3 of the tongue [4].

Facial palsy often involves:

- Lack of tear production in the affected eye, causing a dry eye with risk of corneal ulceration.
- In Facial Nerve palsy, there are 2 problems which contribute towards making the eye dry:
- The greater petrosal nerve, derived from the facial nerve, supplies the parasympathetic autonomic component of the lacrimal gland. - controlling the production of moisture/tearing in eyes.
- The zygomatic branch of the Facial Nerve supplies Orbicularis Oculi, and the resulting paralysis causes inability (or reduced ability) to close the eye or blink, so the tears (or indeed artificial lubrication in the form of drops, gel or ointment) are not spread across the cornea properly.

- Hyperacusis = sensitivity to sudden loud noises
- Altered taste sensation [4].

DIAGNOSIS OF BELL'S PALSY

The characteristic findings are acute onset of unilateral lower motor neuron facial paralysis that affects muscles of the upper as well as lower face and reaches its peak by 72 h. These findings are frequently accompanied by symptoms of neck, mastoid or ear pain, dysgeusia, hyperacusis or altered facial sensation. These associated symptoms are present in 50–60% and are reassuring for the diagnosis of Bell's palsy [3].

After acute facial paralysis, preganglionic parasympathetic fibers that previously projected to the sub- mandibular ganglion may regrow and enter the major superficial petrosal nerve. Such aberrant re- generation may lead to lacrimation after a salivary stimulus (the syndrome of crocodile tears) [2].

BRAIN MRI

Brain MRI is not routinely indicated, but if it is performed, the most common abnormality seen is contrast enhancement of the distal intracanalicular and labyrinthine segments of the facial nerve; the geniculate ganglion, as well as the proximal and distal tympanic and mastoid portions of the facial nerve, may also be involved (Fig. 5A).12 A central pontine lesion (e.g., an infarct, as shown in Fig. 5B) may also produce facial weakness and is often associated with additional neurologic symptoms and signs [2].

ELECTRODIAGNOSTIC STUDIES

Incomplete return of facial motor function and synkinesis (involuntary movement of facial muscles accompanying voluntary facial movement) are long-term sequelae in some patients. These sequelae

are predicted by a lack of early clinical improvement in complete facial paralysis and by results of electroneurography; such testing may be clinically useful in patients with complete paralysis [2].

Electroneurography uses a maximal electrically evoked stimulus and recording technique to measure the amplitude of the compound action potential of the facial muscle13; the extent of nerve degeneration can be determined by comparing the paralyzed side of the face with the normal side. After facial-nerve compression or complete transection by trauma, axonal degeneration is not evident for a few days. Thus, electrical testing should not be performed until three days after the onset of complete paralysis [2].

CEREBROSPINAL EXAMINATION.

Lumbar puncture markedly increases the reliability of the diagnostic work-up and is recommended byneurologists as a standard part of it. In 10–40% of cases initially diagnosed clinically as idiopathic peripheral facial nerve palsy, an abnormal CSF finding is made with specific implications for treatment (20–24). The main CSF laboratory parameters to be tested are cell count, protein, cytology, lactate, borrelia antibody specificity index (ASI), VZV (PCR), and CXCL13.CSF investigation enables the detection of herpeszoster oticus with 85% sensitivity and of borreliosis.

PHARMACOLOGICAL MANAGEMENT

1) Glucocorticoids;

Glucocorticoids Oral glucocorticoid treatment is supported by high-quality evidence from meta-analyses of randomized clinical trials (7, 28). Treatment should be initiated as soon as possible after the onset of symptoms. either prednisolone 25 mg bid for 10 days (4), or, alternatively, prednisolone 60 mg qd for 5 days, followed by a taper to off with a reduction of the dose by 10 mg each day from day 6 onward. From an endocrinological viewpoint, the single daily dose of glucocorticoid is best taken in the morning, as this suppresses the adrenal axis to alesser extent. In meta-analyses of randomized, clinical trials, most recently by Madhok et al. (2016), glucocorticoid treatment was found to bring about a significantly better and more rapid recovery of facial nerve function [9].

2) Virostatic Agents;

The viral hypothesis (reactivation of HSV type 1) concerning the etiology of idiopathic peripheral facial nerve palsy implies that combined treatment with a glucocorticoid drug and a virostatic drug might be beneficial. The clinical trials that have been performed to date to answer this question are, however, relatively heterogeneous. 10out of 13 trials had to be excluded from the analysis because of an unknown or high risk of bias affecting the findings. With respect to the primary endpoint (percentage of patients with some degree of residual facial paresis at the end of the study), no significant difference was seen between combined treatment and glucocorticoid monotherapy (RR 0.81; [0.38; 1.74]; 3 trials, n = 766) [9].

KINESIO TAPING

Kinesio Tape has been designed to allow for a longitudinal stretch of 55-60 % of its resting length. This degree of stretch approximates the elastic qualities of the human skin. The tape is not designed to stretch horizontally. The Kinesio Tape is applied to the paper substrate with approximately 25(1 of available tension. The average roll of Kinesio Tape can stretch 35% fr01n its resting length. The elastic qualities of the Kinesio Tape are effective for 3-5 days before the elastic polymer diminishes [10].

The thickness of the Kinesio Tape is approximately the same as the epidermis of the skin. This was intended to limit the body's perception of weight and avoid sensory stimuli when properly applied. After approximately 10 n1inutes, the patient will generally not perceive there is tape on their skin [10].

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

Introduction

This chapter deals with introduction about dry needling, acupuncture and musculoskeletal system overview.

DRY NEEDLING

Dry Needling is the process of inserting a thin, monofilament needles to the body as used in the practice of acupuncture, without injecting any substance. Dry needling is basically used to treat muscles, ligaments, tendons, subcutaneous fascia, scar tissue, peripheral nerves, and neurovascular bundles for the management of a variety of neuromuscular-skeletal pain syndromes [1].

National Physical Therapy Association, and several State Boards of Physical Therapy have recently narrowed their definition of dry needling to an 'intramuscular' procedure, i.e. the insertion of needles into nodules within taut bands of muscle, more commonly referred to as 'trigger points' (TrPs) or 'myofascial trigger points' (MTrPs) [1].

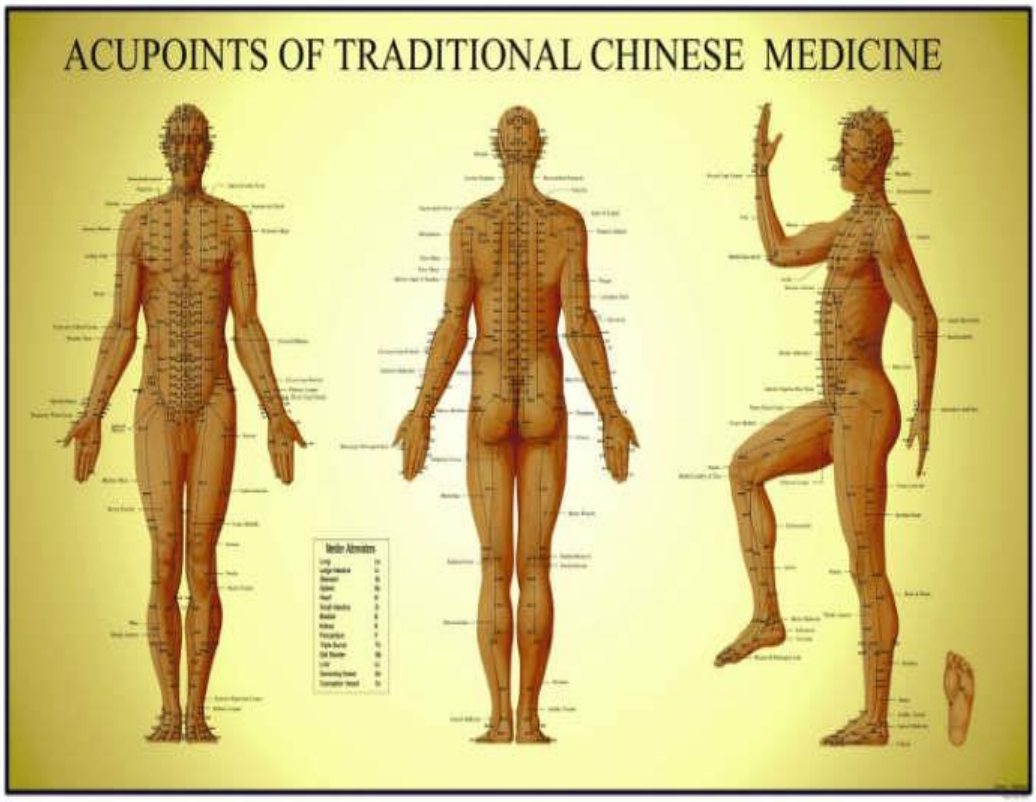
Acupuncture is defined as the insertion of an empty hypodermic needle to stimulate relative areas. Acupuncture has been used in traditional Chinese medicine for more than 3000 years as a treatment for many diseases and is especially well accepted in china [2].

According to the philosophy of traditional acupuncture, energy circulates in 'meridians' located throughout the body When something occurs to cause this meridian energy circulation to be blocked, pain or ill health will result. The way to restore energy circulation, health, and balance, is to stimulate the appropriate combination of the estimated 400 traditional meridian acupuncture points in the body. According to acupuncture theory, one indication that acupuncture is exerting its analgesic effects is that a patient may experience a sensation of numbness or tingling, called de qi, t the needle insertion point [2].

ACUPUNCTURE POINTS IN THE BODY

Traditional Chinese medicine has divided the body into 12 major anatomical sections called meridians or channels, a meridian or channel refers to a grouping of certain blood vessels, nerves and muscles. Each of these meridians also includes associated acupuncture points also known as "Acupoints".

For visual simplicity, the graphic below represents the 12 major acupuncture meridians of the body as lines. The points along the lines are the acupoints associated with each meridian (Fig 1).



(Fig.1.1 Acupuncture points by Traditional Chinese Medicine)

Acupuncture points by Traditional Chinese Medicine. The 12 meridians of the body are named for the organ to which they connect and are called:

Lung, Spleen, Heart, Kidney, Pericardium, Liver, Large Intestine, Stomach, Small Intestine, Bladder, Triple Burner, and Gallbladder

AN OVERVIEW OF HUMAN MUSCULOSKELETAL SYSTEM

A human musculoskeletal system (also known as locomotor system), is an organ system that gives humans ability to move, using their muscular and skeletal systems. The musculoskeletal system provides form, support, stability, and movement to the body [13]. It made up of bones of the skeleton, muscles, cartilage, tendons, ligaments, joints, and other connective tissues of the body [13].

This system describes the process in which the bones are connected to other bones, and muscles fibers via connective tissues such as tendons and ligaments. The bones provide stability to the body. Muscles keep bones in place and also play a role in the movement of bones [14].

There are however, diseases and disorders that may adversely affect the function and overall effectiveness of the system. These diseases can be difficult to diagnose due to the close relation of the musculoskeletal system to other internal systems [14].

This review focuses on the form of dry needling named ‘PERIOSTEAL PECKING.”

Periosteal Pecking: According to Raso J, periosteal pecking is the form of dry needling in which the tip of the needle contacts the periosteum [3]

Periosteal pecking, has shown a great effects on musculoskeletal conditions. “Felix Mann” stated that, periosteal acupuncture was one of the most important inventions of his medical career. He first introduced the use of the technique in 19 and choose to call it periosteal acupuncture rather than bone acupuncture or osteopuncture because periosteum has a rich intervention and bone does not [4].

RESEARCH QUESTION: Does periosteal pecking has any effects on musculoskeletal pain?

OBJECTIVE OF THE STUDY: The objective of the current study is to review the effects of periosteal pecking on musculoskeletal pain?

OPERATIONAL DEFINATIONS

1. **Periosteal pecking** -is the form of dry needling in which the tip of the needle contacts periosteum [3].

2. Dry needling -is defined as a skilled intervention that uses a thin filiform needle to penetrate the skin and stimulate underlying myofascial trigger points muscular, and connective tissues for the management of neuromuscular-skeletal pain and movement impairments [10].

3. **Acupuncture -** is the process of inserting a fine needles into various locations of the body that illicit a strong and largely predictable reaction [4].

4. Myofascial Trigger points - are defined as an exquisitely tender spots in discrete taut bands of hardened muscle that produce local and referred pain in the body [10].

5**. Active Trigger Points -** an active TrP causes a clinical pain complaint. It is always tender and refers a patient-recognized pain on compression. It prevents full lengthening of the muscle, weakens the muscle, and mediates a local twitch response of muscle fibers when adequately stimulated [10].

6. Latent Trigger Points - a latent TrP is “clinically quiescent with respect to spontaneous pain; it is painful only when palpated. A latent TrP may have all the other clinical characteristics of an active TrP and always has a taut band that increases muscle tension and restricts range of motion [11].

7. ‘Jump sign’ - is the characteristic behavioral response to pressure on trigger points. Individuals are frequently startled by the intense pain. They wince or cry out with a response seemingly out of proportion to the amount of pressure exerted by the examining fingers [11

CHAPTER TWO

REVIEW OF LITERATURE

INTRODUCTION

This chapter deals with the description of the details of the current literature. It explains about the origin, and thorough explanation about dry needling, periosteal pecking and acupuncture versus dry needling.

DRY NEEDLING

According to National Physical Therapy Association, and several State Boards of Physical Therapy, defined dry needling as an 'intramuscular' procedure, i.e. the application of needles into nodules within taut bands of muscle, more commonly referred to as 'trigger points' (TrPs) or 'myofascial trigger points' (MTrPs) [9].

According to study conducted by Dunning et al, on a dry needling, also defined 'dry needling as a skilled intervention that uses a thin filiform needle to penetrate the skin and stimulate underlying myofascial trigger points, muscles, and other connective tissues for the management of neuromuscular-skeletal pain and movement impairments'[9].

EARLY TENDER POINT/TRIGGER POINT THEORY

Dry needling and trigger point theory emerged from the use of injections of anesthetic to treat painful musculoskeletal conditions. Before examining the early development of dry needling, it is worth exploring the early research that led to trigger point theory. While the presence of tight bands and tender nodules in muscles has long been recognized in many cultures, their significance in the production of pain was not really articulated in the West until the twentieth century. In the late nineteenth and early twentieth centuries, a multitude of terms was used to describe pain arising from the muscles, which reflected the lack of coherent understanding. These included muscular rheumatism, fibrositis, rheumatic myalgia, non-articular rheumatism, and fibromyositis [26].

ACUPUNCTURE versus DRY NEEDLING

Acupuncture is thought to have originated in ancient China and is the process of insertion a fine needles into various locations of the body that illicit a strong and largely predictable reaction. In Traditional Chinese acupuncture, these points are believed to correspond to meridians of energy that are unblocked by the needling process. There are conflicting theories as to the time of origin but it could have been as far back as 3200BC [6].

Chan Gunn, a United States based physician with an interest in treating pain, became interested in acupuncture. Over the next few years, he explored the prevalence of tender points in several conditions and concluded that most cases of chronic musculoskeletal pain were complicated by additional signs of radiculopathy. He developed an approach to dry needling that combined features of acupuncture [type of needles and needle techniques] with neurological and tender point models that he called intramuscular stimulation [26].

According to (TCM), pathways called meridians and collaterals traverse the body. These pathways carry qi (pronounced "chi"), or "life energy," from the various organs to the surface of the body and help to regulate yin and yang, the 2 opposing forces that are believed to keep the body in balance. The yin and yang can be thought of in Western medicine terms as the sympathetic and parasympathetic nervous systems in that they have opposing, yet balancing effects on the human body. Traditional acupuncture has been used to treat a plethora of conditions including pain, systemic disorders, psychological disorders and addiction [7].

PHYSIOLOGICAL EFFECT OF DRY NEELING

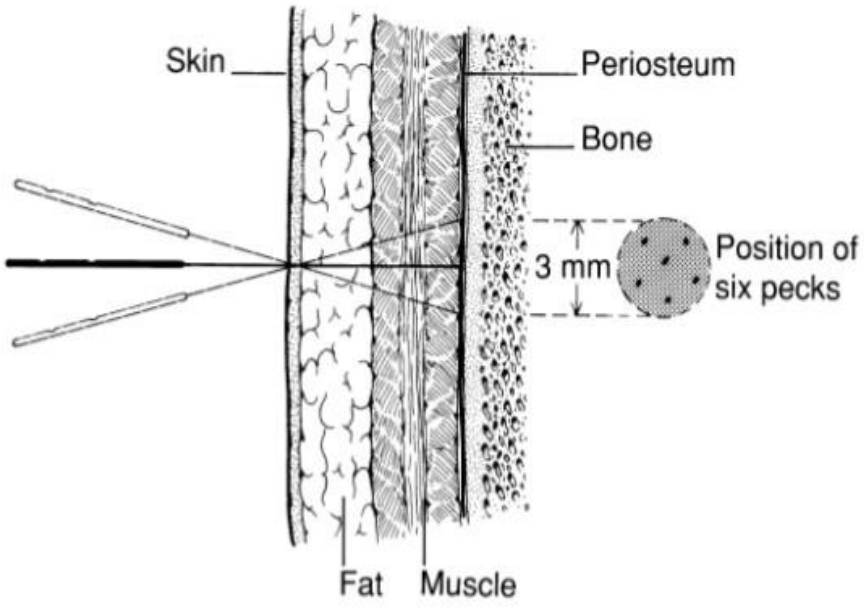
- **Local Effects**: Essentially dry needling stimulates A delta fibers. An afferent fibers travels from distal receptors to the central nervous system. When these nerve fibres are successfully stimulated, the patient will experience a range of sensations. The first experiments on the local effects of acupuncture were conducted by the Chinese. One such article by Chung and colleagues, demonstrated that acupuncture needles had no effect if they were inserted into an area that had been anaesthetized by injection of local anaesthetics, proving for the first time that needling largely affects the nervous system [6].
- A study was conducted by Wang and colleagues, demonstrated that acupuncture generates nerve action potentials leading away from the treatment area [6].

- **Segmental analgesia:** Nociceptive signals elicited by acupuncture travels via afferent fibres to the spinal cord where they depress activity in the dorsal horn 'closing the pain gate' [8].
- **Central effects (brain):** Once action potentials have reached the brain several structures are stimulated. These include the cerebral cortex, the hypothalamus and limbic system. These areas regulate the emotional effective component of pain 'how a person feels about their pain'. These brain areas have various pain regulation effects. Needling may also influence the autonomic nervous system and various hormones. This phenomenon is thought to be the result of actions by the limbic system. The limbic system processes and responds to pain and it is interconnected to a group of structures deep within the brain; these include the amygdale, hippocampus, parahippocampus, anterior cingulated cortex, prefrontal cortex, septum, nucleus accumbens, hypothalamus, insula and caudate [8].

PERIOSTEAL PECKING

Periosteal pecking is a technique of dry needling where the tip of the needle contacts the periosteum [6].

The technique of periosteal pecking was originally described by "Felix Mann" that targets the richly innervated periosteum of bone. He called this form of acupuncture periosteal acupuncture, rather than bone acupuncture or osteopuncture, because the periosteum has a rich network of nerves, whereas the bone has a rather sparse innervation [4].



Technique of periosteal acupuncture

(Fig. 2.0)[4].

TECHNIQUE OF PERIOSTEALPECKING

In periosteal pecking (Fig. 2.0) the needle is inserted in exactly the same way as in ordinary acupuncture. The only difference is that insertion is continued until it hits the periosteum. In periosteal pecking procedure, twisting of the needle has little effects on the periosteum (though inevitably it will have an effect on the skin) for the periosteum is so thin that twisting the thin tip of a needle has little extra effect. What he does instead is to peck the periosteum (i.e. the bone) like a little wood-pecker. The needle remains inserted in the same place the whole time. The looseness of the tissue in most parts of the body is such that the tip of the needle can be moved while the needle remains in the skin [4].

Normally he use a thin, finely pointed, smoothly polished needle, sharpened with a curved point like a sewing needle, so that the needle slips as aut. Possible through the skin: thus the major part of the stimulation is periosteal though some of course, is cutaneous and intramuscular. Mostly the

needle is 0.2 mm in diameter, though sometimes it is 0.3 mm or even 0.35 mm. The length of the needle in most instances is 1.5 cm, 3 cm or 5 cm [4].

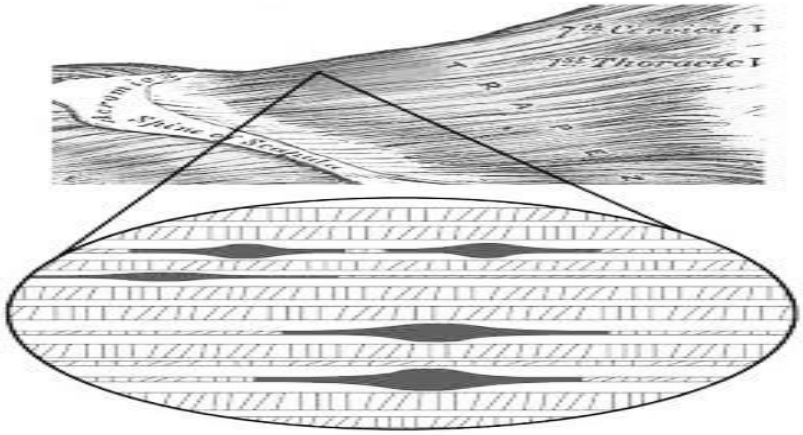
MYOFASCIAL TRIGGER POINTS (MFTrPs)

Trigger points: are defined as an exquisitely tender spots in discrete taut bands of hardened muscle that produce local and referred pain, among other.

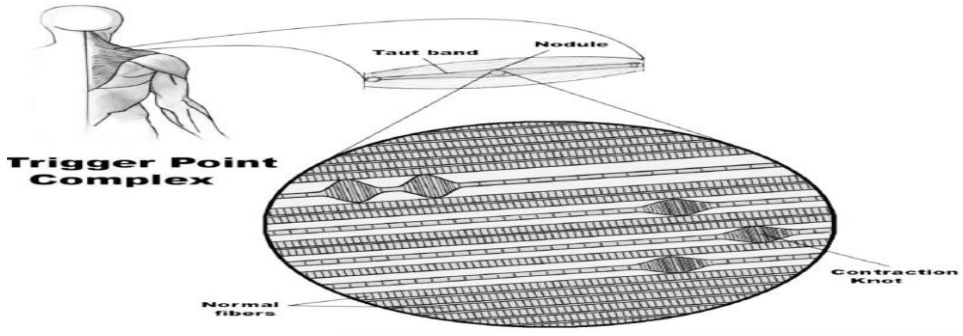
A TrP is composed of numerous so-called contraction knots. An individual contraction knot appears as a segment of a muscle fiber with extremely contracted sarcomeres and an increased diameter [10].

MTrPs is a hyperirritable spot, a palpable nodule in the taut bands of the skeletal muscles' fascia. Direct compression or muscle contraction can elicit jump sign, local tenderness, local twitch response and referred pain which usually respond with a pain pattern distant from the spot [11].

It was (Travell) who brought this term into general use when, in the early 1950s, she introduced e myofascial and began to refer to myofascial TrPs and to describe the pain coming from these as myofascial pain. She adopted the term myofascial as a result of observing, whilst doing an infraspinatus increase a stiffness of the muscles to that when the same is done to the muscle itself. Following this, she realized that each muscle in the body has its own specific pattern of myofascial TrP pain referral and she introduced the term myofascial pain syndromes – a term that has since been generally accepted [12].



(Fig. 3.0) Trigger points at Upper Trapezius [11].



(Fig. 4.0) A Trigger points complex at Upper trapezius muscle [11].

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The pictured diagrams above (Fig. 4.0 and 5.0) are showing the feature of trigger points which usually seen at upper trapezius muscle at upper back and shoulder blades.

'**Jump sign**' is the characteristic behavioral response to pressure on trigger points. Individuals are frequently startled by the intense pain. They wince or cry out with a response seemingly out of proportion to the amount of pressure exerted by the examining fingers. They move involuntarily, jerking the shoulder, head, or some other part of the body not being palpated. A jump sign thus reflects the extreme tenderness of a TrP. This sign has been considered pathognomonic for the presence of TrPs pain pattern distant from the spot.

Local twitch response - defined as a transient visible or palpable contraction of the muscle and skin as the tense muscle fibers contract when pressure is applied caused by needle penetration or by transverse snapping palpation.

Referred pain, also called reflective pain, is pain perceived at a location other than the site of the painful stimulus. Pain is reproducible and does not follow dermatomes, myotomes, or nerve roots. There is no specific joint swelling or neurological deficits. Pain from a myofascial TrP is a distinct, discrete and constant pattern or map of pain with no gender or racial differences able to reproduce symptoms - referred pain map. Radiating pain is slightly different from referred pain; for example, the pain related to a myocardial infarction could either be referred or radiating pain from the chest. Referred pain is when the pain is located away from or adjacent to the organ involved; for instance, when a person has pain only in their jaw or left arm, but not in the chest) muscle biopsy, that the pain pattern evoked by stretching or pinching the fascia [11].

TYPES OF TRIGGER POINTS

1. **Active Trigger Points:** an active TrP causes a clinical pain complaint. It is always tender and refers a patient-recognized pain on compression. It prevents full lengthening of the muscle, weakens the muscle, and mediates a local twitch response of muscle fibers when adequately stimulated [10].

. Latent Trigger Points: a latent TrP is "clinically quiescent with respect to spontaneous pain; it is painful only when palpated. A latent TrP may have all the other clinical characteristics of an active TrP and always has a taut band that increases muscle tension and restricts range of motion [10]

THE EFFECTS OF PERIOSTEAL PECKING

The therapeutic main effect of periosteal pecking includes a pain suppressing effects, due to its irritant action on the periosteal nerve endings, evoking activity in the pain inhibiting mechanism in the central nervous system (gate control model of pain) thereby decreasing pain and inflammation. Below here are the effects of the technique based on researches that been done to prove the efficacy of the intervention on human musculoskeletal system conditions:

1. *EFFECTS ON LOWER BACK PAIN*.

Periosteal pecking intervention said to have a good effect on lower back pain. Different studies proved that pecking on the spinal vertebrae has played a critical role in curing pain.

The following evidence based on previous studies has supported the therapeutic effects of periosteal pecking;

A patient had bilateral low backache and also pain on the right side of his neck. When the patient was standing and was examined from behind, it was apparent that his spine was leaning laterally to the left, with spasm of the left sacrospinalis in the lumbar area. There was lateral flexion of the neck on the right to compensate. The sacrospinalis was examined and the most tender area on the left at the level of L2 was needled down to the lateral side of the spinous process of L2. After repeated treatment, both the back and neck pain were cured [4].

2. EFFECTS ON KNEE OA.

Periosteal pecking intervention has shown to have an effect on relieving pain on osteoarthritic knee patients. The evidence below has proven the effects.

A multicenter randomized control trial study was conducted recently by Dunning et al, in 2018. to compare the effects of adding dry needling into a manual therapy (MT) and exercise program on pain, stiffness, function, and disability in individuals with painful knee osteoarthritis (OA).

They concluded that individuals receiving dry needling at knee combined with manual therapy has shown a greater effect on pain and function than manual therapy and exercise alone [15].

3. EFFECTS ON MEDIAL TIBIAL STRESS SYNDROME TYPE (SHIN SPLINT).

A comparative study was done by Robertson in 2003, which compared the effect of therapeutic ultrasound alone and the other group has received a therapeutic ultrasound combined with Periosteal pecking on Medial Tibial syndrome type II (shin splint). The results of the study has concluded that periosteal pecking when combined with ultrasound is more effective for the treatment of Medial Tibial Stress Syndrome Type II, than that of patients treated by therapeutic Ultrasound alone [16].

Another single case study report into the effectiveness of periosteal pecking in the treatment of shin splints found complete resolution of pain in two days [19]

4. EFFECTS ON NECK PAIN (CERVICAL DYSTONIA).

In august 2010, a case report study was successfully conducted on a 65y old woman with cervical Dystonia, by “Ravindran Deepak” and colleagues. The study title was Effectiveness of acupuncture on cervical dystonia. The results of the study has shown that the patient has shown a greater improvement on pain relieve (50%) after she received a needling on the painful and tender areas on

the neck, and during delivering of the sessions, the needle was inserted till periosteum of the cervical vertebrae [17].

5. EFFECTS ON HIP JOINT OA.

A prospective randomized controlled trial comparing a form of periosteal pecking with intra-articular injections in reducing chronic pain associated with osteoarthritis of the hip (n=32), found that there was equal effectiveness in relieving the associated pain between both the two treatment techniques[1].

CHAPTER THREE

METHODOLOGY

INTRODUCTION

This chapter deals description of methods used in the current study and flow diagram by the use of PRISMA flow style.

- **Study design:** A literature review was conducted in order to provide an overview of the effectiveness of periosteal pecking on musculoskeletal pain. Review provides a summary of large bodies of evidence and reviews help to explain differences among studies.

- **Search strategy**: Relevant articles were identified by search engines such as GOOGLESCHOLAR, PUBMED, COCHRANE DATA BASE OF SYSTEMATIC REVIEW (www.cochrane.org), and CINALE. Website like Physiopedia (www.physiopedia.com) were searched, and a published texts were also reviewed in this studies.

- **The keywords:** Periosteal pecking, Acupuncture, Dry needling on pain, acupuncture and pain, dry needling, musculoskeletal pain.

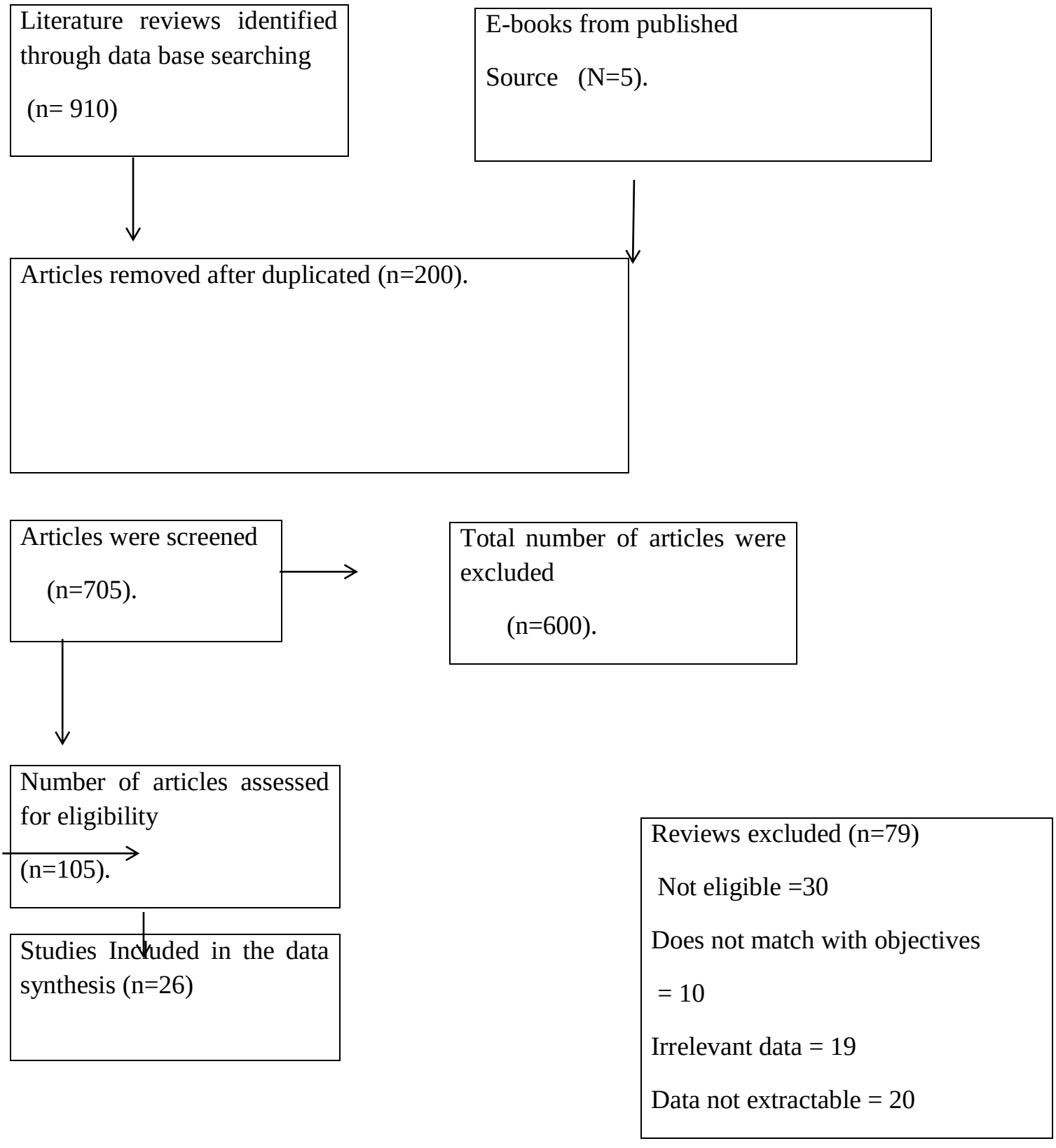
- **Data synthesis:** 105 published articles were screen, and 26 articles were selected after met with including and excluding criteria.

- **Type of study:** Literature review

- **Inclusion Criteria:** Any published randomized control trials (RCTs) studies which matched with the objective of the study and level III studies were included in the study.

- **Exclusion Criteria: S**tudies were excluded if were not published, any case studies, case series or any study which covered the whole acupuncture intervention were also excluded in this study.

PRISMA FLOW DIAGRAM



CHAPTER FOUR

DISCUSION, CONCLUSION AND

REFRENCES

DISCUSION

The periosteal pecking technique has existed since decades and works within different parts in the body to treat the musculoskeletal pain in a numerous clinical conditions. Its existence in the field of physical therapy has shown a greater significance for treatment protocols.

After reviewing a numerous studies which are associated with the efficacy of the technique on human musculoskeletal pain, many conclusions can be drawn. Some authors concluded that periosteal pecking intervention is clinically significant more than so many different interventions, but some authors has proven that the intervention has an equal or even less effects compare to other approaches. Despite the conclusions by the authors, periosteal pecking has played a vital role in relieving pain associated with musculoskeletal condition.

This study concentrated on conditions that have specifically been brought about the effectiveness of periosteal pecking in treating musculoskeletal pain and gives positive as well as equal effects with other interventions in pain. There are many other techniques which are associated with needling and acupuncture, but have not fulfill the objective of the current study and are not covered here. This was left with 26 studies which fulfill the main objective of the study.

CONCLUSION

Due to limited number of researches, a systematic review was not conducted. With regards to the findings and conclusions of different studies, I concluded that periosteal pecking has significantly effective in relieving pain associated with musculoskeletal conditions. More studies need to be done in the future to correctly evaluate the effectiveness of periosteal pecking.

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