Myofascial Pain Syndromes– Trigger Points

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In 1977, Melzack and colleagues concluded that there was a 71 percent correlation between myofascial trigger points [TrPs] and acupuncture points. Myofascial trigger points and acupuncture points were thought to be similar. Three recent papers re-examine the relationship between acupuncture points and TrPs and help to clarify which acupuncture points do, and which do not, correspond to TrPs and why. Birch completed the most academic study on the subject and concluded that at best, only 18 percent-19 percent of acupuncture points examined in the 1977 study could possibly correlate with TrPs. According to Birch, "acupuncture points and TrPs do not show any meaningful correlation." At the same time, Birch suggested that there may a relevant correlation between the so-called a shi points and TrPs, an opinion shared by Hong, Ardette and Blinder.

Several clinical studies and case studies are included in this review. Unfortunately, not all researchers define TrPs well and some confuse fibromyalgia tender points with TrPs. A study by Edwards and Knowles supports the use of superficial dry needling in the treatment of TrPs. Perhaps superficial dry needling should be referred to as cutaneous dry needling to clearly distinguish it from deep dry needling intended to penetrate a TrP.

A very important contribution to the literature on TrPs comes from the National Institutes of Health, where Shah and colleagues have developed a new microanalytical technique that makes it possible to assess the chemical milieu at TrP locations. This kind of research could eventually expand the integrated TrP hypothesis and provide new insights in the basic pathophysiology of TrPs. At this point, they have not yet published any full-length research articles detailing their intriguing findings.

Each article review indicates whether it is prepared by Simons [DGS] or Dommerholt [JD].

CLINICAL STUDIES

Musculoskeletal Dysfunction in Men with Chronic Pelvic Pain Syndrome Type III: A Case-Control Study: D.C. Hetrick, M.A. Ciol, I. Rothman, J.A. Turner, M. Frest, R.E. Berger. J Urology 170:828-831, 2003.

Summary

Sixty-two men with chronic pelvic pain syndrome [CPPS] type III and 89 healthy men were examined by a physical therapist experienced with patients with pelvic floor pain and

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Journal of Musculoskeletal Pain, Vol. 12(2) 2004
http://www.haworthpress.com/web/JMP

Digital Object Identifier: 10.1300/J094v12n02_06

dysfunction. The examination included several tests for posture, muscle strength, range of motion and flexibility, and palpation of the psoas, groin and pelvic muscle attachments for tension and pain. Voluntary muscle contractions were assessed manually for symmetry, substitution, resting tone, muscle spasms, and subject perceived sensation. Initially the physical therapist was not blinded to subject patient or control status; however, as the study progressed, she reportedly was blinded. Sixty-nine percent of the pain patients and 70 percent of the controls were seen unblinded. The researchers found significant differences in muscle tenderness, tension, and abnormalities in pelvic muscle function between patients and controls. They concluded that muscular dysfunction appears to be common in patients with CPPS type III.

Comments

Although the article refers to previous studies and reports of muscle dysfunction and myofascial trigger points [TrPs] associated with pelvic pain dysfunction, the researchers did not report that they considered TrPs in the palpation of muscles. For a thorough review of TrPs in the pelvic region, see chapter six of the second volume of the Trigger Point Manual (1). Several studies have suggested that pelvic pain dysfunction may indeed be significantly due to TrPs (2,3). Instead, the examiner attempted to manually asses muscle tone and spasms without defining these concepts and without adequate descriptions of the methods used. Determining the degree of muscle tone by manual palpation is not all that reliable. Simons and Mense reported that total muscle tension is most accurately measured as stiffness (4). Measurable sources of muscle tension include viscoelastic tone, physiological contracture, voluntary contraction, and muscle spasm. Voluntary contractions and muscle spasms require motor action potentials to generate tension. It is not clear from the paper how the palpations were executed. Unfortunately, the examiner was only blinded for part of the study. Future studies that would include the assessment of TrPs, blinded examiners with established interrater reliabilities, and standardized evaluation methods may provide more detailed information about the nature of the noted muscle dysfunctions. Note: the classification of CPPS type III is based on a proposal of the 1995 National Institute of Health Workshop on Chronic Prostatitis. Chronic pelvic pain syndrome categories I and II are similar to acute and chronic bacterial prostatitis, category represents inflammatory [III A] and non-inflammatory [III B] CPPS without demonstrable infection, and category IV indicates nonsymptomatic histological prostatitis [JD].

Superficial Dry Needling and Active Stretching in the Treatment of Myofascial Pain–A Randomized Controlled Trial: J. Edwards and N. Knowles. Acupunct Med 21:80-86, 2003.

Summary

Forty patients out of a total of sixty-six with musculoskeletal pain referred to physical therapy met the inclusion criteria and were included in this randomized prospective study of superficial dry needling combined with active stretching. Inclusion criteria were age 18 and over, presence of active myofascial trigger point [TrP], identified by spot tenderness in a taut band, subject recognition of elicited pain on palpation and painful limitation of full range of motion, no other treatment during the trial, and ability to comply with the trial. The presence of a local twitch response and pain in an expected distribution were not considered essential for inclusion, but were used to confirm the diagnosis of myofascial pain syndrome [MPS] consistent with the criteria defined by Simons, Travell, and Simons (5). Fourteen patients were assigned to a group receiving superficial dry needling using acupuncture needles with a needle penetration depth of approximately 4 mm combined with active stretching exercises; 13 subjects received stretching exercises alone and another 13 subjects were no-treatment controls. A physical therapist trained in the identification of TrPs examined all subjects to determine whether they had clinically relevant TrPs. A total of six TrPs in each subject were recorded. Subjects in the intervention groups received three weeks of intervention followed by three weeks of home

exercises only. Outcomes were assessed with the Short Form McGill Pain Questionnaire and pressure pain thresholds of the primary TrP. Most measurements were conducted by two blinded and trained observers. When the observers were not available, the primary investigator conducted the measurements for a total of 24 percent of the outcome measurements. Interestingly, there were no statistically significant differences between the three groups after three weeks. However, after another three weeks, the group receiving superficial dry needling and active stretching scored significantly better on the SFMPQ compared to the no-intervention group and significantly better in the pressure thresholds compared to the active stretching only group. The authors suggested that stretching alone might have adverse effects on TrP sensitivity. They also emphasized that significant numbers of patients with musculoskeletal pain appear to suffer from TrPs.

Comments

The introduction to this article suggests that the authors are very familiar with the current thinking about MPS and TrPs. The diagnostic criteria were appropriate and clearly identified. They emphasized that patients with multiple clinically relevant TrPs are very common in clinical practice. Sixty-one percent of the patients referred to physical therapy with musculoskeletal pain by general practitioners suffered from MPS. Successful treatment may require multiple treatment sessions. The study protocol reflected their insights and considered the effects of superficial dry needling over a three week period. Superficial dry needling has been promoted by Baldry, but there are only few clinical outcome studies (6).

Superficial dry needling combined with an active stretching program was superior to stretching alone and to no-intervention. Although the researchers used the pressure threshold of the primary TrP in their outcomes, they did not indicate how they determined which TrP was the so-called primary TrP. Simons, Travell, and Simons defined a primary TrP as "a central TrP that was apparently activated directly by acute or chronic overload, or repetitive overuse of the muscle in which it occurs and was not activated as a result of trigger-point activity in another muscle" (5). In clinical practice, it is not always easy to determine which TrPs qualify as primary.

Regrettably not all outcome measures were blinded, which may have introduced some bias. Yet, the study supports that superficial dry needling over TrPs is an effective treatment modality. Other well-designed studies are needed that compare the efficacy of superficial dry needling to deep dry needling and to manual therapy techniques such as contract-relax techniques or TrP pressure release.

The authors suggested that physical therapists and general practitioners practicing acupuncture are well placed to use dry needling techniques in their respective practices. In several countries physical therapists are now authorized to use dry needling techniques, including the United Kingdom, Switzerland, South Africa, and Spain among others. In the United States, state boards of physical therapy in Maryland, Virginia, New Hampshire, and New Mexico have already ruled that dry needling falls within the scope of physical therapy practice in those states [JD].

A Preliminary Comparison of the Efficacy and Tolerability of Botulinum Toxin Serotypes A and B in the Treatment of Myofascial Pain Syndrome: A Retrospective, Open-Label Chart Review: A.M. Lang. Clin Ther 25(8):2268-2278, 2003.

Summary

Dr. Lang conducted a retrospective open-label chart review of 91 patients who had received either botulinum toxin type A or type B as part of their treatment regimen for myofascial pain syndrome. Fifty-six patients received botulinum toxin type A and 35 patients received type B. Myofascial pain syndrome was diagnosed if active myofascial trigger points [TrP] and referred pain were identified. Other etiologies, pregnant or lactating women, minors, and patients with neuromuscular junction disease or infection were excluded. The choice between botulinum toxin type A and B was solely based on insurance approval or preauthorization. No effort was made to ran-

domize subjects. Patients received more than one injection with some patients receiving injections during more than one treatment session. Patients returned for reassessment one month following the procedure or when pain returned.

The primary outcome measure was the reduction in Visual Analog Scores with secondary measures including duration of treatment effect and subjective improvements. Most patients received injections in multiple muscles. Both groups experienced significant relief of pain. However, the Botulinum type A group had significantly greater reductions in pain than the type B group. Few patients in either group reported adverse effects. Dr. Lang concluded that the two available Botulinum serotypes should not be used interchangeably, as the treatment effects do appear to differ.

Comments

Dr. Lang acknowledged the limitations of open-label retrospective chart reviews. Not only was she the only observer, the patients were not blinded and they were not randomly assigned to either treatment group. Yet, this kind of research is valuable. Prospective double blind randomized control studies are now needed to see whether the findings of this study can be repeated. The choice of which botulinum serotype to use for which patient or condition may have important implications for clinical practice [JD].

The Effects of Infrared Laser and Medical Treatments on Pain and Serotonin Degradation Products in Patients with Myofascial Pain Syndrome. A Controlled Trial: Y. Ceylan, S. Hizmetli, Y. Silig. Rheumatol Int Nov. 20, 2003 [Epub ahead of print. The publisher did not yet assign page numbers].

Summary

The authors stated that forty-six subjects diagnosed with myofascial pain syndrome [MPS] using criteria of the American College of Rheumatology were randomly assigned to a treatment group [N = 23] or a placebo group [N = 23] in this study of the effects of infrared [IR] laser therapy on myofascial trigger points [TrP]. Patients with systemic disorders or patients using any medications were excluded. Subjects in the treatment group received IR laser and subjects in the placebo group received sham laser. A Gymna 200 laser with a wavelength of 904 nm was used for three minutes for each TrP at a frequency of 4 kHz. All patients received medical treatment consisting of 500 mg naproxene sodium twice a day and 400 mg phenbrobomat three times a day. All patients were given a diet free of banana, pineapple, walnut, tomato, and eggplant. On the fifth day, the study protocol was started. Pain was evaluated using a visual analog scale for each TrP following digital palpation until the nail bed of the first finger whitened. The same physician applied the pressure in all subjects. Twenty-four hour urinary excretions of 5-hydroxy indole acetic acid [5-HIAA], serotonin [5-HT] 5-hydroxy tryptophan [5-HTP] were collected on day five and on day nine. Seven subjects were excluded from the final data analysis leaving 19 and 20 subjects in the treatment and placebo group, respectively. Post-treatment decreases in the Visual Analog Scale scores and increases in 5-HIAA, 5-HT, and 5HTP excretions were all significantly greater in the treatment group compared to the control group. The authors concluded that IR laser treatment of TrPs was significantly more effective than placebo treatment.

Comments

This study demonstrates that the use of IR laser is beneficial in the treatment of TrPs, assuming that the authors actually treated TrPs. They stated that the patients were diagnosed with MPS "according to the American College of Rheumatology criteria." This is problematic since the American College of Rheumatology never developed criteria for MPS. It appears that rather than treating TrPs, the authors applied IR laser to fibromyalgia tender points. While it is likely that in some patients with fibromyalgia, fibromyalgia tender points may in fact represent TrPs, it is not clear from this study which points the authors treated (7). Measuring urine excretions of 5-HIAA [a metabolic metabolite], 5-HT, and 5-HTP [a serotonin precursor] is an outcome method that has

not been applied previously to research on TrPs. It appears that the physician applying the pressure over TrPs was not blinded to the research. Also, using manual palpation is not a reliable method to assess pressure thresholds. In future studies, the authors should consider using standardized algometry with blinded evaluators [JD].

Investigation of the Effect of GaAs Laser Therapy on Cervical Myofascial Pain Syndrome: L. Altan, U. Bingöl, M. Aykaç, M. Yurtkuran. Rheumtol Int Dec. 12, 2003 [Epub ahead of print. The publisher did not yet assign page numbers].

Summary

Fifty-three patients were randomly assigned to a treatment group [N = 23] or a control group [N = 25] in this study of the effect of GaAs laser on myofascial trigger points [TrP]. Inclusion criteria were 1. localized pain and taut bands in the neck for at least three months; 2. bilateral and significantly more tenderness in the three cervical trigger points [midpoint of the upper border of the trapezius muscle, origin of the supraspinatus muscle, and insertion of the suboccipital muscle] compared to a control point [a non-tender point over the deltoid muscle]; 3. existence of no other criterion for fibromyalgia syndrome [FMS] diagnosis; 4. no history of finding of cervical arthrosis, discal hernia, cervical vertebral fracture, radiculopathy, or myelopathy; 5. no pathological finding in blood count, urinalysis, sedimentation, or cervical x-ray. Subjects in the treatment group received an infrared 27 GaAs diode laser treatment for 10 days during a period of two weeks with a wavelength of 904 nm and a frequency of 1000 Hz. Subjects in the control group received sham treatments. Treatment was directed toward the three points described in the inclusion criteria and a point in a taut band in the trapezius muscle. Baseline and outcome measurements were performed just before, immediately after [two weeks], and 12 weeks following the treatment by a blinded evaluator. Outcome measures included a visual analog scale, a numerical rating scale, algometry over the various points, and goniometry for cervical lateral range of motion. Five subjects were excluded, as they were not available for follow up assessments. The authors concluded that there were significant advantages of GaAs laser over placebo in the treatment of cervical myofascial pain syndrome.

Comments

This study appeared promising at first glance. The outcome measures were reasonably objective and were assessed by a blinded evaluator. However, the authors confuse the literature on TrPs with the literature on FMS. The treated points were FMS tender points and not TrPs, making it impossible to draw any meaningful conclusions about the efficacy of GaAs laser therapy on TrPs [JD].

Back Extensor Muscle Fatigability in Chronic Low Back Pain Patients and Controls: Relationship Between Electromyogram Power Spectrum Changes and Body Mass Index: M. Pääsuke, E. Johanson, M. Proosa, J. Ereline, H. Gapeyeva. J Back Musculoske Rehab 16:17-24, 2002.

Although there was no recognition of the existence of myofascial trigger points in this well-designed research study, it is of interest to these reviewers because of the congruence between their findings in subjects with low back pain and the effects of TrPs on muscle function. They found that the muscles of their patients exhibited significantly shorter endurance times, increased rate of decrement of the mean power frequency with exercise, and reduced isometric endurance time. Also, reduced isometric endurance time was correlated with increased body mass index [DGS].

CASE REPORTS

Myofascial Pain from Pectoralis Major Following Trans-Axillary Surgery: M. Cummings. Acupunct Med 21(3):105-107, 2003.

Summary

A 28-year-old female presented to an acupuncture teaching clinic with complaints of

pain in the left arm and chest. Eighteen months earlier, the patient had a trans-axillary resection of the left first rib because of a left axillary vein thrombosis. Two months after the surgery the patient required a venoplasty. Initially, the patient described left-sided chest pain at a drain site, which eventually developed into a permanent heavy aching with sharp and burning exacerbations involving not only the chest, but also the medial aspect of the left arm, forearm, and hand. The patient experienced a "pinching" sensation in the pectoralis major and a "pulling" in the fourth web space of her left hand. Her medic intercostobrachial nerve, rotator cuff atrophy, Raynaud's phenomenon, and possible scarring around the C8/T1 nerve root.

Approximately seven months after the onset of the permanent pain, the patient consulted the acupuncture clinic. A myofascial trigger point [TrP] was observed in the left pectoralis major muscle at the drain site. The TrP was treated with two gentle and brief needle insertions of 10 seconds each. The patient was instructed to stretch the muscle at home. Two weeks later, she reported that the paresthesia in the arm had resolved with improvement of the "pinching" feeling. The "pulling" in the hand had increased. Two additional needle insertions in the pectoralis TrP using a dry needling technique completely resolved the symptoms within two hours following the second treatment.

Comments

Trigger points are commonly seen after trauma, irrespective of the nature of the traumatic insult. Cummings described an interesting case of myofascial pain syndrome at a drain site following a surgical procedure. Several aspects of this case report are relevant as they illustrate broader issues. Myofascial pain syndrome was not considered in the differential diagnosis by the patient's medical consultants. The symptoms caused by TrPs mimicked other pathologies, which indeed had to be considered. However, by excluding myofascial pain syndrome as a possible option, the patient was deprived from effective management and suffered needlessly for many months. The author had considered that the "pulling" sensation in the hand could be due to a satellite TrP. It is rarely possible to distinguish a satellite TrP from a primary or key TrP by examination alone. As Simons, Travell, and Simons described, the relation usually is confirmed by simultaneous inactivation of the satellite, when the key TrP is inactivated (5). The report illustrates that in some chronic cases, a single TrP can be responsible for a multitude of symptoms. The author did report examining other muscles of the functional muscle unit, but did not find any other clinically relevant TrPs. The author did not indicate whether the patient remained symptom-free several weeks or months after the treatments [JD].

Toothache of Nonodontogenic Origin: A Case Report: P. Mascia, B.R. Brown, S. Friedman. J Endod 29(9):608-610, 2003.

Summary

A 25-year-old female presented to a postgraduate endodontics university clinic with complaints of spontaneous pain on the left side of her face that began several hours earlier and radiated to her ear and temporal region. Taking 650 mg of acetaminophen had provided no relief. Tooth #18 exhibited symptoms of pericementitis, but anesthetizing the tooth had no effect on her symptoms and no other dental source of the pain could be identified. Since no dental source of the pain could be found the patient was examined for a myofascial trigger point [TrP] cause. An TrP was located in the left masseter muscle that when compressed referred pain to the mouth, effectively duplicating the patient's chief complain. Injecting it with Carbocaine without epinephrine and a fan-like pattern of dry needling produced immediate pain relief that had continued at the 12 months follow-up examination.

Comments

This is another example of referred pain from a masticatory muscle that was confusingly similar to pain that can originating in the teeth. The authors are to be congratulated on considering TrPs in the differential diagnosis. The prompt elimination of the TrP source of

the pain was easily accomplished just a few hours after onset and before substantial central nervous system plasticity changes converted the acute episode into a chronic pain condition that is much harder and more expensive to treat. Although the authors did not mention a trial of manual therapy techniques before turning to injection, in acute cases like this, they are usually also promptly effective [DGS].

Myofascial Pain Response to Topical Lidocaine Patch Therapy: Case Report: A.S. Dalpiaz, T.A. Dodds. J Pain Palliat Care Pharmacoth 16(1):99-104, 2002.

Summary

A 39-year-old female with chronic myofascial pain syndrome, fibromyalgia, and systemic lupus erythematosus participated in an open clinical trial assessing the efficacy of topically applied lidocaine 5 percent patches as an alternative to trigger point injections. The pain evaluation for the purpose of this report was limited to myofascial pain. After 28 days of lidocaine therapy averaging three patches per day over active myofascial trigger points [TrP], the patient reported a decrease of her worst pain from a 9 to a 5 on a visual analog scale from 0 to 10 and a decrease of her average pain from a 7 to a 2. The patient's functional capacity increased as measured by such activities as vacuuming her home and gardening. She reduced her medication intake considerably. The authors commented that other subjects in the study did not always report such dramatic improvements.

Comments

Relying on a subject's score on a visual analog scale is not the most reliable method to determine the efficacy of a therapeutic intervention on TrP pain, particularly when the subject has at least two other painful medical conditions. Studies of clinical efficacy should include other more objective measurements, such as algometry over TrPs. While lidocaine patches may be useful in the treatment of TrPs, this case study has too many confounding aspects to reliably come to that conclusion. The authors correctly acknowledge that "a conclusion about the potential usefulness of the lidocaine five percent patch in myofascial pain must await completion of this open-label trial and subsequent controlled trials" [JD].

REVIEWS

Myofascial Trigger Points: Pathophysiology and Correlation with Acupuncture Points: C.-Z. Hong. Acupunct Med 18(1):41-47, 2000.

Summary

Hong summarized the clinical features of myofascial trigger points [TrPs], and extensively described the research reports including animal studies that clearly describe a credible pathophysiology of TrPs. He reached two conclusions on the relationship between acupuncture points and TrPs. First, the Ah-Shi points [Oh Yes! Points] of acupuncture correspond to TrPs and that the mechanism for pain relief by needling TrPs may be similar to relief by acupuncture of Ah-Shi points. Second, he believes that the de-chi response is a sensation produced by the acupuncture needle that is comparable to the local twitch response and that in both cases, the best therapeutic results are related to eliciting these responses. Hong emphasizes the strong relation of these points to central nervous system function.

Comments

Hong is a leader in clinical and basic TrP research and a native of Taiwan who was initially trained in acupuncture. He is particularly well qualified to address this issue and is in agreement with Birch and with Audette and Blinder whose opinions were also reviewed in this issue. We agree that the original Melzack article relating acupuncture points and TrPs is highly flawed in a number of ways, not the least of which was the way that the location of TrPs was determined. There are many more locations for TrPs in muscles. We also agree that one class of acupuncture points correlate highly with TrPs. A number of clinicians have observed noteworthy better responses of TrPs to treatment that incorporates both acupunc-

ture and TrP principles. This is an approach that deserves serious research investigation [DGS].

Trigger Point-Acupuncture Point Correlations Revisited: S. Birch. J Altern Compliment Med 9(1):91-103, 2003.

Summary

In 1977, Melzack and colleagues published a literature-based review examining the possible correspondence of acupuncture points and myofascial trigger points [TrP] for the treatment of pain (8). They reported that all of the 56 examined TrPs were within 3 cm of an acupuncture point. Forty of these TrPs [71 percent] were reported to have the same pain indications as the corresponding acupuncture points. Melzack and colleagues concluded that there was a 71 percent correlation and that TrPs and acupuncture points "represent the same phenomenon." As Birch summarized, this study had a profound impact particularly on the further development of the theoretical foundations of acupuncture, but also on the treatment of TrPs (6). Melzack's study provided evidence for many researchers and clinicians that acupuncture had an established physiologic basis and that acupuncture practice could be based on the reported correlations with TrPs.

Birch concluded that the 1977 study was based on several "poorly conceived aspects" and "questionable" assumptions, including the notion that all acupuncture points must exhibit pressure pain; that the 40 correlated acupuncture points are normally used in the treatment of pain conditions and are among the more commonly used acupuncture points; and that only the local pain indications of acupuncture points are sufficient to establish a correlation. Birch conducted an extensive study of the current literature on acupuncture practice, some of which was either not available or included in the mid-1970s review.

Birch found that only approximately 18 percent-19 percent of acupuncture points examined in the 1977 study could possibly correlate with TrPs. According to Birch, "acupuncture points and TrPs do not show any meaningful correlation." At the same time, Birch suggested that there may a relevant correlation between the so-called Ah-Shi points and TrPs. He explained that in the acupuncture literature, the "Ah-Shi" points belong to one of three major classes of acupuncture points. There are 361 primary acupuncture points referred to as "channel" points. There are hundreds of secondary class acupuncture points, known as "extra" or "non-channel" points. The third class of acupuncture points is referred to as "a shi" points. By definition, a shi points must have pressure pain. They are used primarily for pain and spasm conditions. Melzack and colleagues did not consider the "Ah-Shi" points in their study, but focused exclusively on the channel points and extra points.

Comments

Birch's argument that the primary acupuncture points and TrPs do not have any meaningful correlation is a radical turn from the conclusions drawn by Melzack and colleagues 26 years ago. Yet, the rational he has developed to reject the previous conclusions is quite convincing. Birch is a world-renowned acupuncturist and author of several books and articles on acupuncture (9-11). In his writings as in this study he displays an in-depth understanding of acupuncture and the different classes and applications of acupuncture points. Birch has incorporated more recent findings from the acupuncture literature into the current study design. We agree with Birch, that the "Ah-Shi" acupuncture points may indeed be TrPs. An acupuncturist identifying a shi points may not be familiar with the literature on TrPs and thus not identify them as such.

One additional difficulty with the 1977 study is that TrPs were assumed to be in rather fixed anatomical locations making comparisons with acupuncture point maps of primary acupuncture points feasible. Although the trigger point maps suggest that there may be certain fixed locations, clinicians and researchers should be aware that TrPs can occur in various locations within a muscle. Melzack and colleagues used a somewhat arbitrary 3 cm criterion and found that all examined TrPs corresponded to an acupuncture point. But to quote Birch: "it is probable that there is some overlap in the loca-

tion of acupuncture points and trigger points, but it is unlikely to be more than chance, and such similarity of location does not imply a correlation." Classical acupuncture points and TrPs may after all not necessarily represent the same phenomena [JD].

The Pathogenesis of Muscle Pain: S. Mense. Current Pain and Headache Reports 7(6): 419-425, 2003.

Summary

In this review article, Dr. Mense provided an overview of several peripheral and central mechanisms of muscle pain. He focused on the neurobiology of muscle nociceptors, including the various receptor molecules, their neuropeptide content, and especially the sensitization of peripheral nociceptors leading to tenderness and hyperalgesia. Animal research has shown that different types of nociceptors are present in muscle, including a nociceptor that is sensitive to ischemic contractions. In another section of the article, Mense reviewed much of his and other researchers' findings on mechanisms of muscle pain at the spinal level, including expansion of receptive fields, hyperexcitability, and central sensitization, which can account for referred pain from myofascial trigger points [TrP]. Due to neuroplasticity, the functional reorganization of the spinal dorsal horn may outlast the initiating peripheral lesion. In addition, inhibitory interneurons may become dysfunctional causing nociceptive neurons to be chronically disinhibited and hyperactive. In Mense's words "this tells us to abolish the muscle pain as early and effectively as possible to prevent central nervous alterations. If a patient already has developed alterations, treatment will be difficult and long-lasting because alterations need time to disappear."

Comments

Mense has published an excellent up-to-date review article on muscle pain that in many cases can apply to TrPs. Although Mense warned that applying animal research data to human conditions is at best speculative, he did indicate that several pain syndromes might involve peripheral muscle nociceptors. Nociceptors sensitive to ischemic contractures are likely involved in patients with tension type headaches, myofascial pain syndrome or fibromyalgia. Persistent pain referred from TrPs is likely due to neuroplastic changes and central sensitization that are likely to persist long after the initiating event has been resolved. Clinically, it is important to prevent the onset of central nervous system alterations. Evaluating acute and subacute patients for the presence of TrPs is critical. By treating TrPs early on, patients may be spared from becoming chronic pain patients, even though not all patients with muscle lesions become chronic pain patients. If a patient has developed chronic pain, the recovery is much slower, as the central nervous system alterations can take much time to reverse and disappear [JD].

Evaluation of Treatments for Myofascial Pain Syndrome and Fibromyalgia: N.J. Rudin. Current Pain and Headache Reports 7(6) 433-442, 2003.

Summary

This review article described both myofascial pain syndrome [MPS] and fibromyalgia. One of the objectives of the article was to assist clinicians in designing individualized treatments in the context of pathophysiology, clinical evidence, and experimental support. After a brief general introduction, Dr. Rudin reviewed both clinical syndromes, detailing some epidemiologic data, diagnostic criteria, pathophysiology, and a review of several treatment options. According to Dr. Rudin, there are three major constructs to explain the pathophysiology of MPS. The first construct was described as a result of tissue injury secondary to repetitive muscle overload or direct muscle injury, and the subsequent release of kinins and inflammatory mediators. This would lead to sensitization of peripheral nociceptors and the formation of painful local muscle contraction and the development of myofascial trigger points [TrPs]. The second construct briefly mentioned Hubbard's hypothesis that TrPs are due to muscle spindle dysfunction. Along the same lines, Rudin mentioned that "another

theory posits excessive activity of acetylcholine at the motor endplate." Rudin suggested that the most promising construct considered TrPs as a referred pain phenomenon. He briefly mentioned a few neuroplastic changes at the spinal dorsal horn, including expansion of receptive fields, but did not explain how TrPs would fit into this construct. The final part of the section on MPS described several treatment options, including muscle stretch, exercise, TrP injection, massage, pharmacologic interventions, modalities, acupuncture, psychology, and multidisciplinary team treatments.

Comments

There are several issues with the section on MPS in this article. Although Rudin suggested that there are three different constructs to explain MPS, he actually mentioned four constructs [overload, muscle spindle, motor endplate, and referred pain]. None of the constructs were explained very well. Rudin's presentation suggests that these constructs would be mutually exclusive, which they are not. Muscle overload can result in the formation of TrPs, which in turn can initiate both peripheral and central sensitization processes, including an expansion of receptive fields. The role of the muscle spindle is clearly not a primary factor (5, pp. 78-81). Dr. Rudin supported the overload construct with three references that have little to do with MPS or TrPs. One reference discusses excitation of cutaneous nociceptors; the second reference is a chapter about the role of the sympathetic nervous system in pain, while the third reference discusses the importance of neuropeptides in complex regional pain syndrome. Rudin ignored the important motor effects of TrPs, including the local twitch response.

The review of available treatment options highlights that there is a lack of good clinical studies. Several references in the treatment section are nonspecific for TrPs. For example, Rudin quoted multiple dental studies, that do not include TrPs, but are based on Dworkin and LeResche's criteria for temporomandibular disorders, that are not designed to identify TrPs reliably (12). In summary, this review article contains many inaccuracies and inadequacies; as a result it tends to confuse rather than clarify the issue [JD].

Myofascial Pain Syndrome: P. Reilich and D. Pongratz. In: Botulinum Toxin in Painful Diseases: W.H. Jost (ed). Basel, Karger, 14:23-41, 2003.

Summary

This review begins with a clear description of myofascial pain caused by trigger points [TrP] and tabulates 15 clinical differences between TrPs and fibromyalgia. It describes the integrated hypothesis as the basis of TrPs and includes illustrations of histopathological substantiation and spontaneous electrical activity characteristic of TrPs. Well established manual and needling methods of treatment of TrPs are reviewed before an extensive review of the use of Botulinum toxin. The authors illustrate their technique and conclude that botulinum toxin is effective, but more studies are needed to determine when and how best to use it.

Comments

The authors present an up-to-date understanding of the integrated hypothesis and of the clinical characteristics of TrPs. They present a knowledgeable perspective to the injection technique and expected results, but make no mention of the relative effectiveness of alternative TrP treatment approaches such as dry needling or manual therapy [DGS].

A Search for the Pathophysiology of the Nonspecific "Occupational Overuse Syndrome" in Musicians: J.W. White, M.G. Hays, G.G. Jamieson, I. Pilowsky. Hand Clin 19:331-341, 2003.

Summary

The literature reflects a strong controversy as to whether this condition does or does not depend on physical pathology. Of 27 articles addressing possible pathology of occupational overuse syndrome, only one considered fibromyalgia/myofascial pain. The authors noted that the pain is caused by activities in music in

the workplace without recognized evidence of specific disease or injury. They propose that continuous or repeated musculoskeletal activity varies the sensitivity of some part of the structure proportional to the intensity and duration and inversely proportional to the efficiency of the activity. The sensitivity can be modulated by numerous other factors. This process limits the level of activity when it exceeds the individual's current level of fitness [which can be described as musculoskeletal overload]. The authors recognize the need for further effort to identify the reasons for poor response to treatment but ignore myofascial trigger points as a likely cause of the symptoms.

Comments

This current article on this important topic demonstrates the lack of clinical literature related to TrPs and this clinical condition, the sense of frustration with the current situation, and presents the authors' suggested solution that is compatible with TrPs as the underlying cause. The one reference to TrPs that was cited was written by this reviewer 17 years ago and led them to conclude that myofascial pain has not received generally accepted explanations. However, acceptable explanations are in the subsequent literature by numerous authors, evidenced by related reviews by Hong, and by Reilich and Pongratz in this issue [DGS].

Differential Diagnosis: Myofascial Pain Syndrome (Chapter 8): J. Dommerholt, T.S. Issa. In: Fibromyalgia Syndrome: A Practitioner's Guide to Treatment, Ed. 2: Chaitow (ed). Edinburgh, 149-177, 2003.

Summary

An initial scholarly critique of the diagnostic criteria of the fibromyalgia syndrome [FMS] precedes a thoughtful review of 12 differential diagnoses to be considered. Following this is an extensive summary of the myofascial pain syndrome caused by trigger points [TrP]. This summary includes a discussion of four therapeutic approaches, of its pathophysiology–based on a clear understanding of the integrated hypothesis, and diagnostic considerations. The latter summarizes the key features of the patient's medical history and the dependence of confirmation of the diagnostic impression on a skilled physical examination of the muscles. The article concludes with the characteristic referred pain patterns of 50 skeletal muscles and suggests that an assessment of FMS tender points should be followed by an assessment of TrPs that refer pain into the region of the FMS tender points.

Comments

This is an unusually clear and knowledgeable review of FMS and TrPs and of their close interaction. The review emphasizes the importance of learning to recognize each condition and the importance of looking for them in musculoskeletal pain patients.

There is a major source of confusion. Recent literature strongly supports the clinical impression that nearly all FMS patients have some active TrPs, and some patients have many active TrPs contributing to their pain. When both conditions are active, it is important to recognize that fact and include both in the patient's total management plan [DGS].

The Relationship of Neck Injury and Posttraumatic Headache: R.C. Packard. Curr Pain Headache Rep 6(4):301-307, 2002.

Summary

This review of literature concerning the cause of headache following whiplash injury identified structural damage, myofascial trigger points [TrPs], stimulation of the occipital nerve, tissue changes with healing, and psychological factors. Conclusions included the statement that ". . . performing a physical examination is unable to determine the site or the severity of the pathology."

Comments

Clearly the author of this literature review article had some awareness of the TrP literature and is to be commended for his feeling for the importance of TrPs in whiplash injuries.

He cited the second edition of volume 1 and copied several figures [with appropriate recognition of the source with one exception] from the Trigger Point Manual but with errors in the reference, as is often the case (5). The author's conclusion concerning physical examination of these patients suggests that he has not developed sufficient skill in palpating for TrPs to find them in these patients, whereas they were commonly present for a skilled examiner (13,14). The author was at a serious disadvantage to present literature documentation for the importance of TrPs, because of the amazing lack of recently published articles on the role of TrPs in whiplash injuries, since TrPs are so common and so important in this condition [DGS].

Managing Myofascial Pain Syndrome; Sorting Through the Diagnosis and Honing Treatment: J.M. Daniels, T. Ishmael, R.M. Wesley. Physician Sportsmed 31(10):39-45, 2003.

Summary

This article, written by a family practice physician for sports medicine physicians, reviews the clinical characteristics of myofascial pain caused by myofascial trigger points [TrPs], its pathophysiology, and its treatment by manual techniques and injection. In addition, the authors briefly summarize distinctions between the TrPs of myofascial pain syndrome and the tender points of fibromyalgia [FMS]. The authors tabulated 11 features of both conditions. Eight features, except two were either more localized in TrPs or, if the feature involved the whole body, they were less common in TrPs. Two features, taut band and twitch response were dismissed as not varying from normal in either type of hypersensitive spot.

Comments

The authors are to be highly commended for their effort to introduce TrPs into the thinking of sports medicine physicians to help them consider TrPs as an important differential diagnosis and to look for them. It effectively characterizes myofascial pain caused by TrPs and the FMS. Much of the article presented a detailed description of manual and injection treatments for TrPs. The authors provided several guidelines, indications and contraindications for injecting TrPs, without emphasizing that accurate and reliable identification of TrPs requires considerable training and practice (15).

The issue of distinguishing myofascial pain from FMS as diagnoses is one thing, and distinguishing TrPs from tender points associated with FMS as examination findings is quite another. There is accumulating evidence that TrPs can be considered a neuromuscular disease with a specific pathophysiology that explains it characteristic symptoms and many of its effective treatments. However, FMS still lacks a specific pathophysiology that explains anywhere near all of its characteristic symptoms and there is no known curative treatment for that entity.

Jan Dommerholt proposes that clinically patients are perhaps better served focusing on the diagnosable associated dysfunctions, as such, without giving them a generic umbrella diagnosis. David Simons suspects that when the appropriate electroencephalogram and brain-function imaging studies are adequately evaluated, there will be a core brain dysfunction that may account for most of the clinical FMS symptoms, but may correlate poorly with the established diagnostic criteria.

Patients who receive the diagnosis of FMS, whether it fits the established criteria or not, need understanding and appropriate medical attention. Distinguishing active TrPs from tender points ascribed to FMS will help greatly to identify what is commonly a major and treatable cause of much of the patient's symptoms.

The data collected in the authors' table support the many papers that characterize TrPs as a regional pain syndrome and FMS as a generalized pain syndrome. There is relatively little literature that clearly distinguishes TrPs and FMS, and much progress has been made lately in the understanding of both of these common and clinically important conditions. One difficulty is that as TrPs persist and become chronic, they frequently also multiply and become more widespread. It indeed is very likely that many patients diagnosed with FMS may in fact have chronic myofascial pain syndrome [MPS] (7). Gerwin observed that about 45 percent of pa-

tients diagnosed with chronic MPS had clinically relevant TrPs in three or four body quadrants (16). Individuals with active TrPs [especially acute TrPs] but not FMS are considerably more common than those who meet FMS criteria but do not have active TrPs.

Taut bands and local twitch responses are important features of TrPs that help to make the important distinction between TrPs and tender points associated with FMS. Although taut bands are found almost as commonly in normal subjects as in MPS and FMS patients, they are absent in tender points of FMS patients if those tender points are not also TrPs, which sometimes is, and sometimes is not, the case. All TrPs are tender spots. Local twitch responses occur only in taut bands and ordinarily are elicited only by mechanical stimulation of a TrP in a taut band. Therefore, one would not expect them to be associated with any of the tender spots of FMS that are not also TrPs. There is much evidence (17,18) that many FMS patients have both active and latent TrPs, which adds greatly to the confusion. In the same way that the diagnosis of TrPs depends strongly on the history, a valid diagnosis of FMS [in the minds of many] depends strongly on serious involvement of multiple organ systems, increased fatigability, and episodes of impaired cortical function. This approach helps greatly to more clearly distinguish between the two diagnoses [DGS, JD].

BRIEF REVIEWS AND ABSTRACTS

A Novel Microanalytical Technique for Assaying Soft Tissue Demonstrates Significant Quantitative Biochemical Differences in 3 Clinically Distinct Groups: Normal, Latent, and Active: J.P. Shah, T. Phillips, J.V. Danoff, L.H. Gerber (abstract). Arch Phys Med Rehabil 84 (suppl.): A4, 2003.

Dr. Shah and his colleagues at the National Institutes of Health have initiated a very important series of studies sampling the biochemical milieu of myofascial trigger points [TrP]. This abstract briefly summarizes their early findings. It was established that by using a novel microdialysis needle, it is possible to accurately measure concentrations of various chemicals including substance P, calcitonin gene-related peptide [CGRP], bradykinin, norepinephrine, tumor necrosing factor-α, and interleukin 1-β. The subjects were divided into three groups: normal, latent TrPs, and active TrPs. The researchers found increased levels of each of the measured chemicals in the active group compared to normal subjects and subjects with latent TrPs. In addition, the pH of the TrP site was significantly lower in the active TrP group. This abstract included very few subjects. More extensive studies are needed to draw any firm conclusions from this new technique. These studies promise to identify many of the substances in the immediate vicinity of the TrP that are responsible for or contribute to the clinical characteristics. It is possible that the results of future studies by Shah and colleagues could expand the current integrated Trp hypothesis and provide new insights in the basic pathophysiology of TrPs. For example, the increased levels of CGRP combined with the finding of a lowered pH may shift the focus away from presumed excessive release of acetylcholine toward a possible impaired function of acetylcholinesterase, as both CGRP and a lowered pH can effectively reduce the function of acetylcholinesterase [JD].

Acupuncture in the Management of Myofascial Pain and Headache: J.F. Audette, R.A. Blinder. Current Pain and Headache Reports 7(5):395-401, 2003.

Drs. Audette and Blinder provide an extensive review of the basic principles of various schools of acupuncture. They explain some of the difficulties researchers encounter when trying to study the mechanisms and effects of acupuncture. Considering the conclusions of Melzack and colleagues that there is a 71 percent overlap between acupuncture points and myofascial trigger points [TrP] and the description of so-called “ah shi” points, the author suggests that acupuncture should be considered in the treatment of TrPs, especially for those patients who do not experience complete relief from allopathic treatment or who have a preference for alternative approaches to their health care. According to the theory of ah shi points, an ah shi acupuncture point can be

found whenever there is local soreness or pressure in the body, irrespective of the classical acupuncture meridians. Audette and Blinder suggest that unknowingly acupuncturists may already treat TrPs, whenever they treat ah shi points. The efficacy of acupuncture in myofascial pain conditions has been not studied over time. The article by Birch reviewed above offers support for the notion to consider the treatment of ah shi points, but rejects the findings of Melzack's study [JD].

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