CHRONIC PAIN SYNDROMES AND THEIR TREATMENT
II. TRIGGER POINTS

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TRIGGER POINTS are small circumscribed areas of focal hyperirritability. They may be found almost anywhere in the body, both in superficial and deep muscle. Kellgren[1] pointed out many years ago that pain from muscle can give rise to diffuse referred pain within certain defined regions and may be confused with lesions in deep structures. He later succeeded in showing that the interspinous ligaments can be the seat of origin of similar referred pain.[2]

The most intriguing property of trigger points is that they may give rise to pain in areas at some considerable distance and in sites which cannot be readily explained by known anatomical relationships. Those in the neck, for instance, not infrequently give rise to pain referred to the head and face. Others follow a spinal segmental pattern which differs from the segmental innervation of skin,[1] while yet others may be easily identifiable as the source of pain in the very muscle in which they are located. However, they all have in common that stimulation of the area will set in motion a vicious cycle of pain leading to muscle spasm, which in turn increases the pain.

Once a trigger point has been located treatment consists of inactivating it by the injection of a local anaesthetic. This will frequently give freedom from pain for periods far exceeding the duration of action of the local anaesthetic itself. Best results are achieved by inserting the needle precisely into the painful point, previously located by palpation. Patients are usually able to identify this exact point as it is reached by the needle because the contact is particularly painful. Moreover, the operator often experiences a peculiar increased resistance as the needle enters the trigger point. Once located, the needle is held firmly in place and the injection is made. It is often necessary to repeat the process a number of times before permanent relief is achieved. It remains a moot point whether the addition of a steroid to the local anaesthetic actually improves the chances of success.

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Given the distance of some trigger points from the area of referred pain it follows that in all kinds of chronic pain in which the cause is not immediately obvious, it is essential to undertake a diligent search for such points in muscles, even at some considerable distance from the location of the pain.

The following cases, selected from a number of similar ones, will serve as examples of referred pain as well as of the more usual localized pain due to trigger points and which were treated by injection;

Patient 1 (F.K.; R-27)

The medical history of this 54-year-old obese man was uneventful until 1972 when he first complained of neck pain the day after a cholecystectomy. One month later he had a cerebrovascular accident which left him partially paralyzed on the left side and led later that year to an arthrodesis of the left knee. Since then he had pain in the middle of the cervical spine, shooting into the left side of the face and the left eye, accompanied by ringing in the ear. The pain was worse when he was emotionally upset and better when he relaxed. He could fall asleep only when lying on his left side with his head on two pillows. Apart from significant muscle twitching over the entire left shoulder girdle, six definite trigger points could be identified, pressure upon which reproduced the shooting pain into the left side of the face and into the left eye. One trigger point was located in the left paraspinous muscle mass at the level of C_2 close to the midline with a second about 1 cm lateral to it. The third trigger point was 1 cm distal in relation to the upper fibres of the trapezius muscle with the fourth 1 cm further distal. The fifth point was within the sternomastoid 0.5 cm cephalad to the fourth, and finally a sixth 1 cm cephalad to the fifth. Each of these was injected with lidocaine 1 per cent 15 ml and triamcinolone 60 mg. This not only relieved the pain but also the ringing in the ear. Two weeks later the pain in the face had remained under control and the tinnitus was 50 per cent improved. Two weeks later the

ringing had reappeared and at that time four more points were found, two in the substance of the scalenus medius, one in the upper part and one in the middle of the sternomastoid muscle. Injection again succeeded in controlling the trigger points but not the tinnitus. He came back two weeks later when he related that the ringing in the ear disappeared whenever he showered the back of his neck in hot water. Re-examination discovered a residual trigger point to the left on the spine at the level of C_{4-5}. It was injected and he was well for the next four months. Even then the sharp pain had not recurred and the tinnitus occurred only in the morning and was relieved for the rest of the day by applying the shower head to the left side of the neck. Two residual trigger points were injected at that time. He had relief for four months before tinnitus recurred, but since he had been away during the summer, no further injection was done.

Patient 2 (D.McM.; R-70)

Following a right labyrinthectomy in 1965 this 48-year-old housewife was well until about May 1977 when she developed pain at the vertex of the skull, radiating to the back of the head and behind the eyes, as well as ringing in the right ear. At one of the early visits a trigger point was found in the right scalenus medius muscle and another in the splenius capitis on the same side. Following injection of each with lidocaine 0.5 per cent 2.5 ml and triamcinolone 20 mg she became pain-free and the ringing in the ear ceased. She has had seven more injections since, each promptly controlling pain and tinnitus, initially for a matter of only several days, but later for up to four weeks. Treatment was repeated recently and she had again immediate relief.

Patient 3 (S.B.; R-49)

This 53-year-old lady first had spontaneous onset of pain in the left shoulder region five months before she presented at the clinic. There had been no trauma. The pain was a continuous ache with stabbing exacerbations into the left arm when used. The pain improved when movement stopped. There were three trigger points, in the substance of the left trapezius, in the supraspinatus and in the infraspinatus fossa. Injection of these with lidocaine 0.5 per cent and triamcinolone completely relieved this particular pain. She has since continued to present with minor discomfort in the left shoulder girdle and has required trigger point injection on another six occasions in the course of the last ten months. This has kept her comfortable and has enabled her to continue at work as an office clerk.

Patient 4 (B.G.; S-274)

This 45-year-old lady awoke one morning with pain in the right shoulder region five months before she first attended our clinic. The pain was severe enough to warrant two admissions to her local hospital. Subsequent treatment with ultrasound and transcutaneous stimulation had been ineffective. No significant relief had been obtained from indomethacin, phenylbutazone and ketoprofen, tried in succession. On examination she was found to have two trigger points in the superior fibres of the trapezius and one in the deltoid muscle on the same side. Injection of these with lidocaine and triamcinolone resulted in immediate pain relief and, after one further injection the following day, she remained free of pain for the next three weeks. At that time she presented with some discomfort, but this was relatively mild compared to her original state. Re-injection resulted in pain relief again for two weeks, at which time she presented to her family physician for re-injection.

Discussion

The genesis of trigger points is somewhat obscure, but may be due to direct trauma, chronic muscle strain, ischaemia or a host of other common factors.[3] Histologically those in muscle present as small areas of myofibrositis characterized by the presence of a metachromatic substance with platelet aggregation and localized oedema in the interfibrillar connective tissue.[4] It has been postulated that trauma is the reason for the extravasation of platelets which release serotonin and that this causes vasoconstriction; hence the oedema. This in turn results in degranulation of mast cells with consequent liberation of histamine and heparin. The histamine counteracts the vasoconstriction and the heparin prevents clotting of extravasated blood and lymph.[5]

In practice trigger points are most often encountered in the muscles of the shoulder girdle and in the neck. Indeed, in 22 patients with well-defined and sometimes multiple trigger points in superficial muscles who were seen during 1978 in our Pain Management Clinic, 15 occurred in the muscles of one or the other shoulder girdle, involving most frequently the trapezius, and less commonly supraspinatus, deltoid or rhomboids. In five instances trigger points were in the neck,

TABLE I

SOME COMMON TRIGGER POINTS IN MUSCLE GIVING RISE TO DISTANT REFERRED PAIN

Muscle	Area of Referral
Sternomastoid and Scaleni (Figure 1a)	Face and head, including temporal and posterior auricular area, but excluding mouth and nose
Trapezius (Figures 1b, 1c)	
upper fibres	Temporal and posterior auricular areas, angle of jaw and eye
lower fibres	Posterior shoulder up to nape of neck and down to angle of scapula
Infraspinatus	Antero-lateral aspect of arm and forearm, including radial part of hand
Supraspinatus	Posterior shoulder girdle; posterolateral aspect of arm and forearm to wrist
Splenius capitis	Vertex of skull
Serratus anterior	Lower antero-lateral chest wall and medial aspect of arm and forearm, including palm of hand, but exlcuding thumb
Pectoralis	Upper anterior chest wall; upper extremity as for serratus, but excluding three radial digits
Gluteus minimus	Gluteal region; posterior and lateral aspect of thigh and calf

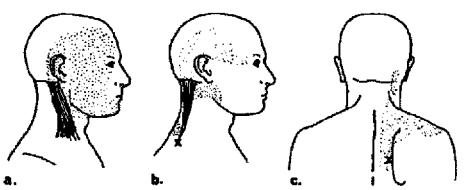

FIGURE 1 Two muscles which are common sites of trigger points and give rise to pain in the stippled areas. (a) sternomastoid and scaleni (not shown), (b) trapezius (upper fibres), (c) trapezius (lower fibres).

affecting sternomastoid, scaleni, or splenius capitis. There were two instances of trigger points in the glutei and one each in the pectoralis and external oblique muscles. As for trigger points in ligaments, two were associated with the inguinal ligament and one with an interspinous ligament.

The four cases reported here have been selected because of the typical distribution of pain from two of the most common sites of trigger points. Those in the neck give rise to referred pain on the ipsilateral side of the head and face (Figure 1a), while those in the trapezius refer to the entire vast extent of that muscle and also include the temporal and supra-orbital areas (Figures 1b, 1c). The surprising feature in Cases 1 and 2 is the disappearance of tinnitus when trigger points in the neck were injected. This particular response has not hitherto been reported as far as could be determined, but it is well known that trigger points in muscle and ligaments can simulate visceral disease.[6] In view of the fact that tinnitus is often refractory to any form of treatment, this observation may have significant practical implications for the treatment of at least some forms of this complaint. On the other hand, musculo-skeletal manifestations from trigger points will remain preponderant, and one should be conversant with the location of the more common points and the areas to which pain is referred.[1-3] Conversely, if the pain referral patterns from muscles and ligaments are known, this knowledge can be used to locate the muscle which gives rise to a particular pain (Table I). These muscle pains can be very chronic and are the cause of much disability and suffering.

It might be argued that the improvements observed from the injection of trigger points are merely a placebo effect. This is unlikely, as the high incidence of success far exceeds that commonly associated with placebo. As far as the control of tinnitus is concerned, a placebo effect cannot be excluded with certainty on the basis of our limited observations, except that the condition in Patient 1 was controlled only when a specific trigger point was injected, and not controlled when that point was missed.

In any event, the realization that many patients

can be cured by a simple injection of local anaesthetic into a painful muscle, repeated if necessary on a number of occasions, is of considerable clinical significance.

Summary

Trigger points are distinct areas of focal hyperirritability which give rise to areas of referred pain in well-defined areas of the musculoskeletal system, sometimes remote from the point itself and not related to it by anatomically definable pathways. While the vast majority of pain manifestations from trigger points are related to the musculo-skeletal system, this need not be invariably so, as has been demonstrated in two of the cases cited, where injection of trigger points in the neck relieved chronic tinnitus. In all manifestations of chronic pain it is recommended that a diligent search be made for such trigger points.

Résumé

Les zones gachettes sont dans le muscle des points d'hyperirritabilité focale qui donnent lieu à des projections douloureuses dans des régions bien définies du système musculo-squelettique souvent éloignées de la zone gachette elle-même et sans relation anatomique démontrable. Bien que la plupart du temps, l'irradiation douloureuse à partir des zones gachettes intéresse le système musculo-squelettique, il n'en est pas toujours ainsi comme le démontrent deux observations au cours desquelles l'infiltration de zones gachettes dans le cou a fait disparaître un bourdonnement d'oreille chronique. Dans toutes les manifestations de douleurs chroniques, l'auteur recommande de rechercher avec application les zones gachettes.

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