HERNIATION OF SUBFASCIAL FAT AS A CAUSE OF LOW BACK PAIN

REPORT OF THIRTY-SEVEN CASES TREATED SURGICALLY

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In July, 1945, in the *Journal of the American Medical Association*, I reported six cases of low back pain in women relieved by excision of herniated fat. Now I wish to record more extended observations in thirty-seven cases of this type subjected to surgical treatment before March 1, 1946, and to show that herniated subfascial fat is a causative agent in producing disabling low back pain in a certain well-defined group of cases.

In the first three cases I observed, the cause of the difficulty was not definitely recognized, nor the results of surgical treatment actually explained. All three were women who had severe and disabling back pain, initiated by trauma, which had recurred in several extremely severe exacerbations. One patient had had recurrent attacks of acute lumbago for fifteen years; this had been incapacitating and required bed rest. In each patient there was a palpable nodule in the sacro-iliac region; pressure on this caused local and radiating pain. Injections of anaesthetic solution around this painful nodule yielded striking and immediate, though temporary, relief. Surgical exploration of the painful area showed only a mass of fat, which was excised. In the first instance in which this was done, the patient experienced immediate relief as soon as she recovered from anaesthesia, and this relief has persisted for nearly three years. This excellent clinical result, though unexplained, furnished justification for performing the same procedure in the other patients with similar symptoms and physical findings, who also obtained relief. The pathologist's report on the tissues removed in these cases was not enlightening. These observations stimulated an inquiry as to the basic cause of the condition and the reason for the relief obtained.

The Work of Copeman and Ackerman

The medical literature afforded no clear explanation until the excellent study by Copeman and Ackerman appeared. These authors charted the trigger points in fifty consecutive cases of low back pain in soldiers (Fig. 1)*. Such points, according to a recent clinical fashion, especially in England, have been attributed to "fibrositis". Hence Copeman and Ackerman first sought, and expected to find, a lesion of fibrous tissue accounting for them.

However, in dissection of fourteen cadavers, they found that the situation of trigger points could not be correlated with any fibrous structures, but that it coincided almost exactly with the basic fat pattern in the back (Fig. 2)*. They found that beneath the subcutaneous fat and areolar tissue lies the highly vascular superficial fascia, which forms a continuous sheet from the neck to the gluteal region. Space between this and the deep fascia is principally potential, containing little or no fat. In certain well-defined places, however, deposits of pink fat constantly occur. These, with equally constant deep areas, constitute the basic fat pattern. In obese persons this fat pattern tends to be obscured by more generalized deposition of fat. The fascias are not of uniform thickness, being notably thinner in certain places, and frequently there are actual deficiencies in the fascial membranes. In these places the underlying fat tends to bulge through, sometimes resulting in complete herniation (fat hernia). These small hernias tend to occur at points where the fascia is weak, and they probably do not give rise to symptoms until some incident, such as sudden trauma or prolonged confinement to bed, produces an increase in the fat pressure and a painful degree of distention. This leads to oedema, which may perpetuate the condition. On the basis of this explanation of "fibrositic" nodules which constitute trigger points of pain, Copeman and Ackerman subjected ten patients to surgical excision of the fatty herniations, with striking relief of severe and disabling back pain.

This report shed considerable light on the subject of these painful fatty nodules, and offered a likely explanation of the clinical results that I had observed. I was puzzled, however, not to find other clinical reports in the literature on relief of back pain by removal of a herniation of subfascial fat. At the time my first paper was published, I had found none. Later, several reports of fatty nodules have come to my attention, and there may be others which have not been found, because they have been reported under varying titles. So far as I have learned, Copeman and Ackerman were the first to furnish a definite anatomical explanation for painful nodules in the back. Others (e.g. Sutro, 1935) have observed fatty nodules in the back and have even observed

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striking relief of pain after injection or excision, but have offered no explanation for this result. It is interesting that even Copeman and Ackerman's report is indexed under "fibrositis", with nothing in the title to suggest that the subject treated is herniation of subfascial fat.

Personal Observations

The rational explanation of my clinical results, which Copeman and Ackerman's careful study furnished, led me to the dissecting room. Findings in the backs of several cadavers were essentially the same as they reported. In a cachectic specimen the fascias were more easily delineated, and the basic fat consisted of a very thin layer. In a normal specimen (Fig. 3), the fat pads were considerably thicker, and the fascias less easily defined, with considerable variation in thickness and more numerous weak points. This apparent tendency to thinning of the fascia with greater quantity of fat is interesting as a possible explanation of the fact that clinically the incidence of low back pain from this cause is much greater in obese women than in any other group. In all specimens dissected, the distribution of fat between the outer and inner layers of the superficial fascia followed approximately the same distribution as that of the fat overlying the superficial fascia. Incision of the deep layer of the superficial fascia revealed a large fat pad, lying over the gluteal region about 3 cm. below the crest of the ilium and about 3 cm. from the spine or midline, which extended below the level of the posterior superior spine of the ilium, and measured roughly 10×15 cm. In all specimens the deep layer of the superficial fascia had several weak areas, through which this fat could very easily be forced into the space between the two layers of superficial fascia.

Between October, 1943, and February 23, 1946, I observed 109 cases of this syndrome. Operation was performed in thirty-seven, and results have been almost uniformly good. Thirty-four patients have had complete relief. In three the results were unsatisfactory.

The typical story in these cases was that trauma resulting from physical strain initiated the back pain, which was extremely severe and often was referred down one leg. In some there had been recurrent attacks of such pain for many years, with periodic incapacitation. In all cases a definite nodule was palpable; this was extremely tender, and pressure on it intensified the pain. Important diagnostic features were the history of trauma, the severity of the pain, the frequency of radiating pain down the leg, and the presence of a palpable tender nodule. The crucial point was the relief of pain and muscle spasm after injection with anaesthetic solution. The following cases are illustrative of the group as a whole.

Case Histories

CASE 1

A man, aged 29 years, presented himself to another physician with severe pain in the lower back and radiating

down the left leg. About fifteen months earlier he had fallen while straining and pulling a heavy object. Three months after this accident he had been placed in a cast, but returned to work about two months later. Leg pain, with occasional numbness, became so severe that he had lost more and more time from work, and had been unable to work at all for a month before he was examined. For several weeks he had had little rest or sleep.

Neurologic examination revealed a drawing and burning sensation and hypalgesia in the distribution of the fourth lumbar nerve on the left. There was slight atrophy of the left thigh, and patellar reflexes on the left were somewhat decreased. The Naffziger test was negative. The clinical diagnosis was a protruded disc between the third and fourth lumbar vertebrae; however, since the evidence was not conclusive, operation was deferred.

Three months later, the patient returned to the same physician for further observation. There had been no relief of pain during the interim, except for some diminution in the left calf. There were no paraesthesias. The left patellar and Achilles reflexes were diminished. A tender swelling was observed in the left gluteal area. Radiographs of the lumbo-sacral spine revealed no abnormalities, and the spinal fluid was normal.

At this point I was called into consultation, and palpated two painful nodules in the left gluteal region. After injection of 3 c.cm. of 2 per cent. procaine solution, the pain abated. A diagnosis of multiple fascial fat herniations in the left gluteal area was made.

At operation, a transverse incision was made over the tender areas through the superficial fascia. A large quantity of fatty tissue was removed and the deep fascia was incised. Bleeding points were controlled with silk ligatures. The wound was closed with three layers of interrupted sutures of black silk, with insertion of a rubber drain and a dry dressing.

The patient was symptom-free after operation, and promptly returned to work. A letter from him, four months after operation, states that he has been in fine condition and has had no pain at all.

CASE 2

A woman, aged 48 years, had had severe, intermittent back pain since a fall thirty years earlier. Fourteen years before she presented herself to me, she had undergone a hysterectomy in an attempt to obtain relief from the back pain, but this was unsuccessful. A palpable painful node was found in the left gluteal area. Relief of pain followed immediately after injection of 5 c.cm. of 1.5 per cent. "metycaine" solution. A few weeks later a second injection produced the same striking though temporary relief. Operation was performed two months after the first examination. The back pain disappeared immediately after operation, and relief has persisted to date, a period of six months.

The Surgical Problem

From a surgical standpoint removal of the palpable fat mass presents some difficulty, especially when there is considerable superficial fatty tissue. In some instances it has not been possible to see a definite mass that could be clearly differentiated as the palpable nodule; in others the definitely lobulated mass is readily discernible. When the palpable nodule (herniation of subfascial fat) cannot be clearly differentiated from the overlying superficial fat, a wide dissection of fat is made down to

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the gluteus maximus muscle (Figs. 4 and 5)*. After excision of this fatty mass, the fascial layer is carefully explored. In some instances the weak point through which the herniation occurred can be determined, and, if so, this is sutured. I prefer usually to close the skin with a subcuticular alloy steel wire, No. 30.

Pathological Findings

The pathological findings in these cases are not of great significance, except that their negative character adds weight to the anatomic explanation of the symptoms. The specimen removed usually consists of mature adipose tissue, sometimes definitely lobulated. In some instances, the lobule of fat has a pedicle, probably the result of long-standing strangulation of the fat hernia. The mature, homogeneous fat (Fig. 6)* is often supported by strands of sparsely cellular, collagenous connective tissue. In some, no degenerative change nor inflammation are found. In others, the fat and collagenous tissue are oedematous and hyperaemic, and may be infiltrated both focally and diffusely with exudative cells, usually chiefly lymphocytes. In one instance in this series, nerve tissue was found in the fat lobule.

The Rôle of Trauma

From the anatomical studies, it seems probable that herniations of subfascial fat may exist potentially or actually in many persons without causing severe symptoms. The rôle of trauma in initiation of symptoms is impressive. When the distention of the fat lobule, owing to protrusion through the fascia and pressure from injury or other cause, is of sufficient degree, the blood supply to the fat may be interfered with, and oedema with occasional haemorrhage occurs. These changes evidently initiate the symptoms. It seems plausible that, with subsidence of haemorrhage and focal oedema in the fat lobule, there may also be subsidence of symptoms, with later recurrence following even a slight precipitating strain. From the histories related by some patients, this would seem the most likely course of events and would also explain spontaneous remissions, and those following massage or some other form of physical therapy. In others, in whom the disability is more or less chronic, it would appear that the oedematous condition does not subside sufficiently to bring relief, and the herniation becomes fixed, perhaps, with development of fibrous tissue in the fatty mass.

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Sex Incidence

The majority (approximately two-thirds) of the patients in this series were women. Since the first seven patients I observed were all women, I thought at first that perhaps the condition was confined to females. However, all Copeman and Ackerman's patients were men, and I have now observed thirty-six men suffering from this type of low back pain, and have operated on eleven of them. In his report on the incidence of fatty nodes in the sacro-iliac region in hospital patients, Sutro commented that while they were sometimes noted in thin persons, the incidence in stout women past middle age was generally highest. This observation agrees with my clinical experience with low back pain attributed to herniations of subfascial fat, in which two-thirds of the patients were women (see Table).

TABLE

HERNIATION OF SUBFASCIAL FAT

* Total number of cases (male, 36; female, 73)	109
Trigger points of pain	109
Relief by injection (temporary)	104
Operation performed	37
Relief following operation	33

Summary

1. Anatomic and clinical evidence is presented that cases of severe low back pain in which painful nodules can be palpated are due to herniation of subfascial fat through the deep layer of the superficial fascia.
2. Temporary relief was obtained by injection of the painful areas with anaesthetic solution in 109 cases of this type.
3. In thirty-seven cases the herniated fat was removed surgically, and in thirty-four there has been complete relief of all symptoms persisting to date (periods ranging from six months to nearly three years).
4. This clinical entity is not uncommon, and its recognition is simple. The presence of a painful nodule, with disappearance of pain after injection with anaesthetic solution, is diagnostic. Surgical treatment in these cases results in continuous relief of severe back pain that may have been disabling for long periods.

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