



REVIEW

Historical Review of Studies on Sacroiliac Fatty Nodules (Recently Termed “Back Mice”) as a Potential Cause of Low Back Pain

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ABSTRACT

Low back pain is a widespread and poorly understood condition that is frequently diagnosed as non-specific low back pain. We were intrigued by the presence of painful sacroiliac nodules in patients with this condition. We conducted a historical review to elucidate this relationship. This chronicled review summarizes the overlooked literature from different countries, especially from around the 1950s, regarding the diagnosis and management of these painful nodules. Biopsies have confirmed the adipose nature of these nodules and revealed distinct pathological signs, including oedema and fascial fatty herniation. Studies have suggested both intra-nodule local anaesthetic injection and surgery as successful treatments for managing pain on a short- or long-term basis. Recent ultrasound studies have

confirmed these findings. The various terms used for these nodules over time are specifically described. We conclude that it may be necessary to reconsider the role of fatty tissue in the aetiology and treatment of low back pain in today’s mainstream medicine. This could lead to advances in understanding unexplained musculoskeletal pain disorders beyond low back pain. Meanwhile, despite the remaining questions, the treatments identified in these studies can help physicians manage patients’ unresolved pain. We recommend that future research use this review as a foundation for further study.

Keywords: Non-specific low back pain; Subfascial fat herniation; Painful fatty nodules; Back mice; Non-articular rheumatism; Fibrositis

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Key Summary Points

This paper presents a comprehensive historical review of studies on sacroiliac fatty nodules as an overlooked potential cause of low back pain.

Intra-nodular local anaesthetic injections and surgical removal are suggested as successful treatments for managing patients’ pain.

The role of fibro-fatty tissue dysfunction as a pain generator merits further attention.

SACROILIAC NODULES

Painful fatty nodules of the lower back are considered a neglected source of back pain. Although lumbar fatty nodules can be easily palpated with proper examination skills, physical examination of these nodules by a doctor seems to have fallen into disuse in the last 70 years, as imaging diagnostic tools have developed and replaced manual techniques. Some doctors do not examine patients in person; rather, they address them from behind a computer. Even if they do examine patients, they may lack the proper skills. Palpation does not have the recognition it once did. Accordingly, many professionals are unaware of the existence of fatty nodules in the lower back (recently named “back mice”). However, if physicians are willing to examine patients’ backs with their fingers, lumbar nodules can be found in the low backs of many in the so-called sacroiliac region. These are best palpated in the sacroiliac area with any lubricant while the patient is standing with the trunk slightly inclined. The patient may tell the doctor exactly where they are located or may be unaware of their existence. Pressure can be applied so that the nodules roll under the fingertips. Most are non-tender. However, tender ones can be a source of an inordinate amount of pain upon applying pressure.

A sacroiliac nodule exhibits certain clinical features. Upon palpation, it feels deeply tethered and often presents as an oval shape, positioned transversely. Its consistency is elastic, and it may move, escaping from under the fingertips. Sometimes there is a single nodule, whereas others can be found in a cluster. Their size typically ranges from 0.5 to 4 inches. Sometimes they are found unilaterally but are often bilateral. In bilateral cases, one side is usually significantly more painful than the other. A striking feature of some patients is their ability to reproduce low back pain while pressing these nodules. Pressure can also trigger a familiar referred pain down the gluteal area, often into the leg. Local pain can persist some minutes after palpation. Finally, an associated spasm of the back muscles may limit movement.

These abnormal fatty growths must be distinguished from other causes that can present as lumbar lipoma-like nodules, such as epidermoid cysts or incipient subcutaneous abscesses, or from malignant fatty tumours, such as liposarcoma [1].

These intriguing nodules were studied extensively in the 1950s. They were considered to be a cause of low back pain, but curiously, the knowledge from this time has generally been overlooked by mainstream medicine. However, thanks to the development of soft tissue sonography, recent studies in this area have been published, and previously overlooked ones have been rediscovered.

Low back pain continues to be a major health problem and the leading cause of disability worldwide. As stated in the recent low back pain series in *The Lancet*, “For nearly all people with low back pain, it is not possible to identify a specific nociceptive cause. Only a small proportion of people have a well understood pathological cause—e.g., a vertebral fracture, malignancy, or infection.... Thus, most low back pain is termed non-specific” [2].

We carried out an exhaustive historical review, foreseeing the potential impact that these studies could have on a specific aetiology of “non-specific” low back pain. This review presents a clarifying view of the subject, and we are confident that this knowledge will shed light on the prevalent “backache problem”. This review is divided into different periods and trends: first, the most recent publications related to sonographic studies; second, a detailed summary of Copeman’s contributions and the doctors who were influenced by his work; and third, other relevant authors.

This article is based on previously published studies and does not contain any original data derived from studies on humans or animals performed by the authors.

THE MOST RECENT PUBLICATIONS RELATED TO SONOGRAPHIC STUDIES

There appears to be a resurgence of interest in the study of these nodules, following years of a

dearth of articles, due to the current trend of performing soft tissue ultrasound examinations. Case reports have been published about ultrasound findings to describe the palpable nodules in a more objective manner. Moreover, medical articles have resurfaced in recent bibliographic reviews. It is important to emphasize that nodules can be felt by a skilled hand and can sometimes be objectively assessed by ultrasound imaging.

Radiologists have contributed substantially to this research with recent publications. In 2018, a group from the Mayo Clinic described “hypermobility” as a main sonographic feature of the nodules in an article titled “Subfascial Fat Herniation: Sonographic Features of Back Mice”. Ultrasonically, they described them as fat located between the superficial and deep fascial layers of the low back near the posterior superior iliac spine. These nodules did not have complete margins, suggesting that they were not lipomas; therefore, the researchers considered “lipomas” to be a misnomer for this entity. The painful nodules seemed to be more mobile under the superficial fascial layer than the asymptomatic ones. Despite adequate sonographic examination, they did not observe any fascial defects [3]. However, the Italian radiologists Farina et al. published a case report in the same year, in which an observed nodule was found to be a well-circumscribed hypoechoic image of herniated fatty tissue through a hernial gap in muscular fascia. The patient’s low back pain resolved after nodule excision with closing of the gap [4].

In 2016, a complete literature review with an illustrative case was published by Bicket et al., although their review was limited to articles written in English. They presented a patient case with bilateral nodules. Deep pressure on them reproduced the patient’s low back pain and numbness of the posterior thigh. They demonstrated ultrasonically how they treated the patient by multi-puncture anaesthetic intranodular injection with long-lasting pain relief [5].

A publication in 2015 from a Chinese spinal surgery orthopaedic department by Yang et al. detailed a percutaneous endoscopic excision. They described the nodule’s ultrasound image

as a “subcutaneous lipoid echo area”. They treated the patient by percutaneous endoscopic decompression under local anaesthesia with nodule excision, resulting in complete relief of pain [6].

These recent studies, although scarce, suggest a potential resurgence of interest in this area of medical research. The use of ultrasound examinations can provide objective assessments and complement the physical examinations of these patients. Although these nodules have been described as not visible in other common imaging techniques, such as X-ray or magnetic resonance imaging (MRI), a recent case report claimed for the first time that these nodules could be visualized using different MRI sequences [7].

DETAILED SUMMARY OF COPEMAN’S CONTRIBUTIONS

Sir W.S.C. Copeman has been, in our opinion, the principal researcher of these painful fatty nodules, having published several articles about the condition. He was a well-known rheumatologist (1900–1970) who played an important role in the development of this medical speciality. He authored the still-referenced *Textbook of the Rheumatic Diseases*. He was a cofounder of the Heberden Society, later the British Society for Rheumatology, and a member of the editorial board of the journal *Annals of the Rheumatic Diseases* from 1954 to 1970 [8, 9].

During the first half of the twentieth century, the presence of painful nodules or spots in the soft tissue was related to a condition named fibrositis, especially in England. Though fibrositis was considered a well-recognized clinical entity (Fig. 1), its aetiology was a matter of speculation [10]. Its main clinical features, wrote Copeman, were pain, tenderness, and stiffness, often with spasm of the neighbouring muscles, not affecting the patient’s general health. The nodules (which were called fibrositic nodules) were considered to be the result of rheumatic disorder, a soft tissue reaction to a variety of stimuli [11].

Copeman observed the neo-formation of fibrositic nodules in certain fevers, then termed

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Fig. 1 An old drug advertisement that mentions the term “fibrositis”. It was commonly used in England at the beginning of the twentieth century. The drug was claimed to be effective in relieving what was then termed

“rheumatic pains”. Diuromil was a mixture of an effervescent compound and is no longer in use. Source: royalty-free image database www.historyworld.co.uk

pyrexial illnesses. By examining febrile patients, he noted in some cases that a whole region was affected, with nodules bulging through the skin. After the acute pyretic phase, some nodules or spots disappeared, whereas others remained asymptomatic or slightly tender. By then, it was common to treat pain related to fibrositic nodules with intra-nodular local anaesthetic injection [12].

Copeman and his colleague Ackerman wanted to understand the nature of fibrositic nodules, so they performed an investigation that included human dissections and patient biopsies. Despite being burdened by war duties, they managed to study the nodules in otherwise healthy young soldiers with backaches or dorsal or cervical pain. They published a paper titled “Fibrositis of the Back” in 1944 [13]. First, they plotted a pain chart with the location of the nodules or trigger points (i.e., spots that cause the patient to wince upon palpation). Second, they performed 14 dissections in male corpses and described the basic fat pads (well-defined fat deposits between the two fascial sheets, even in cachectic specimens). Then, they correlated the pain charts with the distribution of these fat pads (Fig. 2). Consequently, they theorized that the aetiology of fibrositic nodules was related to these deep pads. In obese people, such basic fat pads tend to be obscured by the presence of a more generalized fat deposition.

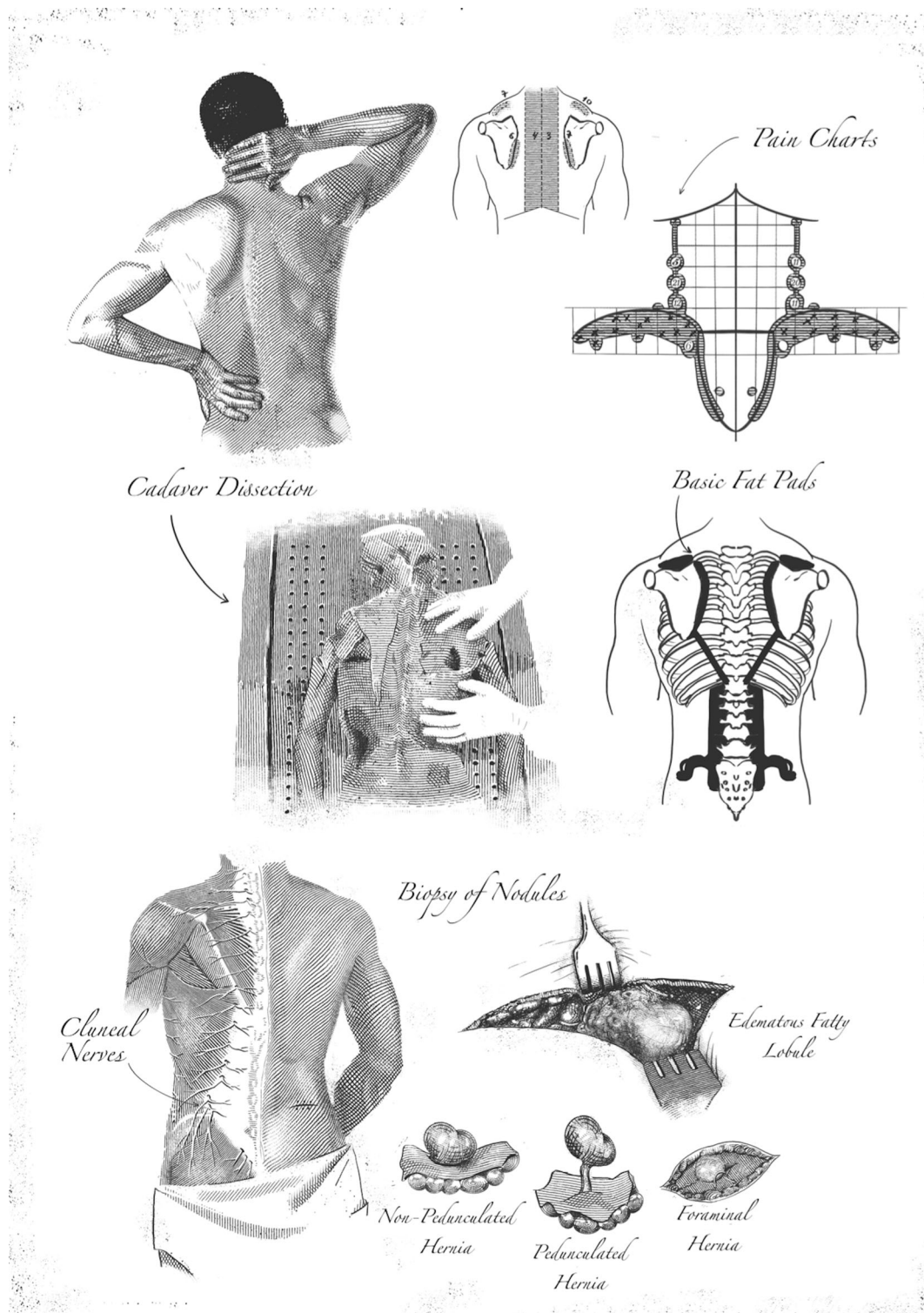
They also performed 10 biopsies where they found the nodules to be tense oedematous fatty lobules of inter-fascial tissue. They theorized that increased tissue tension may cause pressure on the nerve endings, giving rise to tenderness and local pain. In some cases, they observed signs of herniation of the fatty lobules. They described three types of herniation: non-pedunculated, pedunculated, and foraminal (which would appear due to fascial deficiencies or through “neurovascular foramina”) (Fig. 2). They speculated that a protruding lobule could suffer a “strangulation”, resulting in further restraint and perhaps causing the condition to become chronic. Histologically, the biopsied lobules consisted mainly of normal fatty tissue. The researchers did not find signs of inflam-

mation. However, some blood vessels were congested, their walls thickened with perivascular proliferation, and some lobules presented patches of older fibrous tissue. The surgical removal of the oedematous fatty lobules relieved backaches. They hypothesized that sudden fatty herniation could cause acute lumbago by irritating the peripheral nerves (now known as superior cluneal nerves) as they cross the deep fascial layers. They reported that these specific fascial foramina exhibit a kind of valve with the appearance of a horizontal fold of tissue. They postulated that if valve-like tissue is insufficient, fat herniation by sudden muscular contraction, strain, or trauma could cause sudden nerve entrapment.

They developed the treatment technique of “teasing the nodule with the needle”, presuming that by breaking the lobule’s fibrous walls and its pedicle, tissue-confined tension would be released. Their technique consisted of moving a needle under local anaesthetic, providing a longer-lasting result than a simple puncture. Henceforth, they suggested that surgical removal to manage pain would not be necessary in most cases.

As a result of this research, they concluded that pain in “fibrositis of the back” was due to a temporary fluctuation or chronic increase in fatty tissue oedema, leading to tension. Pain is triggered by a confined oedema in a non-distensible fibrous sheath, especially along the erector spinae muscles. That tissue could even herniate, causing severe pain. Minor degrees of fatty oedema may explain the milder pain experienced by many people throughout life and could potentially resolve spontaneously or with massage.

In 1949, Copeman published an article with a wider-ranging view of certain rheumatic ailments, which he attributed to dysfunction in fat–water metabolism. Fatty tissue (with a mesoderm origin) is known to have a water storage function. Certain rheumatic pains, he wrote, might be related to a general maladjustment of the fatty body fluid balance, especially in women. Therefore, in some cases, he postulated that palpable nodules would be a local



◀**Fig. 2** Drawings based on Copeman and Ackerman's article from 1944. They produced a pain chart of the most common locations of fibrositic nodules or trigger points. They dissected corpses and described the distribution of what they called basic fat pads. Biopsies of the palpable nodules revealed them to be oedematous fatty lobules, with some presenting signs of herniation through the fibrous walls of the fascia. The foraminal hernia can pierce the lumbar cutaneous nerves (cluneal nerves) as they cross through the fascial holes. Source: author's drawings, 2019

manifestation of an overall condition. He theorized that several factors could be involved, such as endocrine disturbances, salt metabolism, genetic factors, or weather influences [11].

As a consequence of his studies, he postulated that in all cases of fibrositis—not only in the back—lesions would be caused by oedema dilating the fatty lobules within confined spaces. This syndrome can present as localized trigger points or painful nodules. Occasionally, he wrote, it may cause an enclosed fat lobule to herniate through an adjoining fibrous layer. He went on to postulate that all the aponeurosis and tendons were susceptible to presenting this phenomenon within what he named “basic fat pads”. On two occasions, while dissecting a sacroiliac herniated nodule, he and his colleague were able to trace the pedicle and found it to originate from deeper within the paranephric fat. This suggested to him that this tissue could share an embryogenic origin with intra-abdominal fat.

Over time, the term fibrositis fell into disuse. In his book published in 1954, Copeman insisted that the term fibrositis was wrongly used by doctors and was a portmanteau term at that time [14]. Earlier, at the beginning of the twentieth century, the correlation between fibrositic pain and concomitant febrile illness or focal infection (such as oral infections) had led to the theory that fibrositis had an inflammatory aetiology. However, biopsies never showed any inflammatory or microbial signs, as the term *-itis* would suggest. Hence, over the years, the term fibrositis has been abandoned [10].

DOCTORS THAT WERE INFLUENCED BY COPEMAN'S WORK

Copeman and Ackerman's article influenced many other physicians. After their original publication in the *Quarterly Journal of Medicine* in 1944, several papers came out in different countries that supported their findings. Many authors performed cadaveric dissections to verify the observations about basic fat pads. Others confirmed that the anaesthetic injections could be used both as a diagnostic and, strangely enough, as a therapeutic tool. Some physicians focused on the surgical removal of nodules, with generally good outcomes. They also carried out macroscopic and microscopic analyses. Table 1 briefly describes these articles.

Soon after the article in 1944, Mylechreest (1945) and Herz (1946) repeated the dissections and biopsies in England and America, respectively. Mylechreest, one of Copeman's colleagues, pointed out that the lumbar basic fat pads presumably protect the cluneal nerves and blood vessels as they cross the deep fascial layer. Therefore, he postulated that congestion, oedema, or herniation of this tissue could give rise to severe pain. While performing surgery, he noticed that the fatty tense lobules he found were not always previously palpable as nodules. Sometimes they only presented as tender spots until surgery revealed oedematous fatty lobules [15]. Meanwhile, in North America, Herz also performed cadaveric dissections to investigate the basic fat pads and similarly found that most patients experienced pain relief after local anaesthetic injections, whereas others obtained relief from surgical removal [16]. These were two of the earliest authors to reproduce Copeman and Ackerman's findings.

The new paradigm of relating low back pain to these fatty nodules has encountered some controversies. Hench, a doctor from the Mayo Clinic who received the Nobel Prize for the discovery of cortisone, published his paper reacting to Herz's publication that same year [17]. He admitted to being puzzled by this clinical entity:

Table 1 Copeman's main published articles and articles that corroborate Copeman's work

Year	Authors	Title	Short note
Copeman's main published articles about lumbar <i>nodules</i>			
1943	W.S.C. Copeman	A Clinical Contribution to the Study of the Aetiology of the Fibrositic Nodule	He studied 40 patients with intercurrent febrile illnesses and fibrositic nodules
1944	W.S.C. Copeman and W. Ackerman	"Fibrositis" of the Back	They performed 12 dissections and 10 biopsies
1947	W.S.C. Copeman and W. Ackerman	Oedema or Herniations of Fat Lobules as a Cause of Lumbar and Gluteal "Fibrositis"	They summarized previous work
1949	W.S.C. Copeman	Fibro-fatty Tissue and Its Relation to Certain "Rheumatic Syndromes"	He summarized previous work and reported new findings
Articles that corroborate Copeman's findings published between 1945 and 1990			
1945	W.H. Mylechreest	England An Investigation into the Aetiology and Pathology of Fibrositis of the Back	He dissected 12 specimens and presented 4 case reports of cure following surgical removal
1945	A. Clavero-Nuñez	Spain [The Affections in the Adipose Panicle as a Cause of Lumbosacralgia in Women]	He presented a case report of cure following surgery
1946	R. Herz	USA Herniation of Subfascial Fat as a Cause of Low Back Pain Report of Thirty-seven Cases Treated Surgically	He observed 109 cases with painful nodules; 37 underwent surgical removal, with 34 reporting complete relief
1947	R.J. Moes	USA Nodulation or Herniation of Fat as a Cause of Low Back Pain	He reported 2 cases which were cured following surgery
1948	D.C. Hucherson and J.R. Gandy	USA Herniation of Fascial Fat; a Cause of Low Back Pain	They presented a data table with 32 surgically treated cases with mostly excellent results
1950	H. Dal Lago and A. Vera	Argentina [The Frequency of Fatty Hernias with Necrotic Lesions as a Cause of Lumbago]	They presented the results for 16 surgically treated patients, stating that 25% of the fatty biopsies presented necrosis
1950	K.H. Katz and M.S. Berk	USA Episacroiliac Lipoma as a Cause of Low Back Pain	They presented an illustrative case that resolved after surgery

Table 1 continued

Year	Authors	Title	Short note
1950	R. Herz	USA Subfascial Fat Herniation as a Cause of Low Back Pain Differential Diagnosis of Low Back Pain Based on a Study of Two Hundred and Eighty-one Cases	He studied the incidence of painful nodules related to low back pain; 92 patients were managed by local anaesthetic injections, and 89 cases underwent surgical removal
1952	A. Sicard and G. Lord	France [Episacroiliac Lipomas and Lumbosciaticas]	They treated 12 cases that underwent surgery, 7 reportedly cured while others obtained relief
1952	G.S. Donati and E. Bidoni	Italy [Lipomas from the Sacroiliac Region (Episacroiliac) as a Cause of the Lumbosciatic Syndrome]	They treated 5 women who underwent surgical removal with mostly significant improvement
1953	V. Sheehan	Ireland Epi-sacro-iliac Lipoma and Sciatica	He reported 6 illustrative cases that were cured after excision
1954	C. Knight	USA Sacroiliac Lipoma versus Pannicular Hernia	He operated on 3 patients, with good outcomes
1954	C.D. Bonner and S.C. Kadson	USA Herniation of Fat through Lumbodorsal Fascia as a Cause of Low Back Pain	They reported a case of a woman with unexplained incapacitating low back pain which resolved after surgical removal
1955	M. Monnerot-Dumaine	Egypt [The Episacroiliac Lipoma]	He described two cases that improved with anaesthetic injections
1956	P. Nocentini and I. Rosati	Italy [Anatomicoclinical Picture of Episacroiliac Lipomas]	They published a 37-page article with many photos of 9 operative cases
1957	M. Gomez-Carpio et al	Chile [Clinical and Therapeutic Aspects of the Hernia of the Panniculus Adiposus as a Cause of Lumbosacral Fibrositis]	They studied 12 cases, 9 of which underwent surgery and 3 conservative treatment
1959	H.A. Tibaudin	Argentina [Lumbar Fat Hernias as the Cause of Reflex Lumbosciaticas]	He studied 11 cases; 7 underwent surgery
1959	E.J. Kanan	Brazil [Hernias from the Sacral Fascia]	He performed a study of 160 patients mainly managed by local anaesthetic injection (maximum of 3 infiltrations). Seven underwent surgery
1961	G.F. Wollgast and C.E. Afeman	USA Sacroiliac (Episacral) Lipomas	They presented 4 illustrative cases that experienced relief from surgery

Table 1 continued

Year	Authors	Title	Short note
1963	L. Sedwitz and B.D. Thomas	USA Hernia Adiposa. A Cause of Low Back Pain	They treated 20 patients with low back pain of unknown cause, who had good outcomes after surgical removal
1966	M.L. Singewald	USA Another Cause of Low Back Pain: Lipomata in the Sacroiliac Region	He collected 53 cases, mainly surgical, from several hospitals
1969	CL. Baci	Romania [Copeman and Ackerman Type of Lumbosciatagies]	He studied 321 patients with lumbosciatic pain. Of those, 41% presented painful nodules and 30% had recurrence after surgery
1972	J.B. Pace and C. Henning	USA Episacroiliac Lipoma	They described 4 illustrative cases that underwent effective surgery
1978	R.J. Faille	USA Low Back Pain and Lumbar Fat Herniation	He treated 3 cases with anaesthetic injections and percutaneous radiofrequency
1990	E. Rosati and D. Mariani	Italy [The Role of the Episacroiliac Lipomas as a Cause Pseudolumbociatalgic Syndrome]	They presented 21 cases that were successfully resolved by surgical excision

Through the years I have had my full share of disappointments when trying to find the “classical fibrositic nodules”, especially in cases of painful backs with negative radiographs. Often I could feel no nodules; sometimes I felt one or many “nodules” but on biopsy found nothing very impressive. But on innumerable occasions I have easily felt in the lower back, especially in the pre-sacro-iliac region, nodules singly or in clusters, small, or even large enough to push out the overlying skin. Sometimes they were fairly fixed; many times they were quite movable. Some were tender; many were quite painless, at least for the time being. Assuming that here at last I had found large subcutaneous fibrous nodules, I asked Dr. Ghormley and other orthopaedic colleagues to remove some that were tender. All we found were lumps of normal-looking fat. Sometimes the patients’ symptoms were relieved, sometimes not. We remained puzzled, because

our dissections were too limited to reveal the true nature of the nodules and their relation to underlying fascia and fat.

In a particularly interesting final thought in his article, Hench pointed out a certain parallelism between “herniated fat” and “herniated discs” as causes of low back pain. In his opinion, surgery had been performed in both cases before the exact underlying pathological mechanism was investigated: “Such a current over-enthusiastic tendency to remove the ‘herniated disc’ which most backaches were related to, could now repeat itself with the ‘herniated fat’.”

Nevertheless, in the 1950s, articles continued to report patients with refractory low back pain being successfully cured by surgical excision of the nodules. Among others, the orthopaedic surgeons Hucherson and Gandy noticed that when incising the superficial fascial layer, the fatty nodule or mass “popped out from the wound”, holding this as a direct sign of intense tissue tension [18]. Katz and Berk, from Boston,

operated on an obese woman whose pain had not improved with the injection of a local anaesthetic but did improve after surgical removal [19]. Bonner and Kadson published a case report of a woman with a long history of incapacitating pain (she had even required opioids). She finally improved after the surgical removal of a fatty mass and repair of the fascial defect [20]. In 1954, Knight also remarked that sometimes the nodule could not be palpated; instead, they palpated a kind of “tender thickening”. Nevertheless, since local anaesthetic injection only provided the patient temporary pain relief, they decided to proceed with excising the tender area, obtaining pain relief [21]. Apparently, Copeman’s influence led these surgeons to operate on fatty lumps only as a last resort for patients with unresolved chronic back pain. The surgery was often successful where all other treatments had failed, prompting them to publish their cases to notify the medical community.

Some fatty oedematous lobules present necrotic lesions. Dal Lago and Vera, two Argentinian doctors, reiterated this fact in their article in 1950 [22]; however, Copeman’s research did not reveal such a finding. Though these surgeons were confident that oedematous fatty lobules were a frequent cause of low back pain, their colleagues were not so convinced. To raise interest in this condition among other doctors, they emphasized that a portion of their patients had fatty lobules presenting associated necrotic signs. They theorized that early stages may involve only fatty oedema; if the condition becomes chronic, necrosis due to ischemia may appear in the later stages.

Many publications from other countries corroborated Copeman’s findings. Sicard from France, Monnerot-Dumaine from Egypt, Rosati and Nocentini from Italy, Gomez-Carpio et al. from Chile, and Kanan from Brazil, among others, all supported his work. Sicard, a French surgeon and president of the Académie nationale de médecine, wondered why nodules sometimes presented symmetrically in the sacroiliac region and why some were absolutely painless while others were very painful [23]. Monnerot-Dumaine insisted that “herniated discs” reported in some patients’ X-ray findings

could easily mask the existence of painful nodules, as the two conditions frequently coexisted [24]. Rosati and Nocentini, two Italian surgeons, published a 37-page article describing the anatomical picture of the nodules. They theorized that the fatty neo-formations could have a deeper origin, as suggested by the presence of the pedicle, and the condition could be related to a metabolic-endocrine dysfunction [25]. Kanan, president of the Brazilian Society of Traumatology, published a study that he carried out mainly on women who were treated in a conservative manner with local anaesthetic injections (a maximum of three infiltrations). He also warned that the low back pain from these “fatty hernias” could mimic the pain of “herniated discs”, which was of particular consequence as many patients had coexisting radiological findings, such as spondyloarthritis [26].

Many authors reported that in some patients, back pain could be referred to the buttock and thigh, and in some cases even to the knee and ankle. This pain could sometimes be triggered by pressure on the nodule, via certain movements and positions or spontaneously. They reported that this referred pain disappeared after local intra-nodular injection of a local anaesthetic [15, 16, 23, 25, 27]. In 1950, Tibaudin utilized Steindler’s theory about “reflex pain” to explain how painful nodules could cause referred pain to the leg or other areas [28].

In the 1960s, the existence of painful nodules was mainly overlooked in mainstream medicine. In 1961, the American surgeons Wollgast and Afeman, who had been operating on nodules for 25 years, were shocked that the number of publications had decreased since the 1950s [29]. Singewald, from Baltimore, stated in 1966, “The condition which I shall now describe is a minor one, but one which is capable of producing much pain. It is frequently overlooked in consideration of the causes of low back pain and I have been amazed that so many physicians are unaware of it.” He described a “classic case” of a 50-year-old woman and noted that there seemed to be a predominance of female cases [30]. Pace, in 1972, stated that “accurate diagnosis depends on an awareness of

this entity” and warned that neglecting this entity was leading to unnecessary disc surgery [31].

Other researchers shared Copeman’s earlier view about the existence of a general condition caused by an overall metabolic-endocrine dysfunction in the fatty tissue. In some patients, it was postulated that multiple palpable nodules or painful spots could be a manifestation of a generalized fat–water imbalance. This, in turn, could result in distended, turgid, and painful adipose tissue [11]. This condition, they reported, was commonly found in middle-aged women leading a sedentary life. In 1968, Baciuc from Romania published an article about this condition, which he named “Copeman and Ackerman’s syndrome”. He emphasized that sometimes the only objective sign of this entity would be the presence of nodules near the lateral fossa of the rhombus of Michaelis. Baciuc observed 30% of nodules recurring 4 to 6 months after surgical removal [32].

Since the 1970s, technological advances have led some researchers to use new techniques to treat and diagnose the nodules. Faillie used percutaneous radio-frequency with a needle, which provided patients with pain relief for a year or longer. This American surgeon wrote, “It is a most striking experience to hear a patient who has gone through the whole ambit of medical, gynaecological, and orthopaedic treatment exclaim emphatically ‘That is the point!’ when his episacroiliac lipoma is touched by the examiner” [33]. In 1990, Rosati and Mariani introduced lumbar sonography to complement the diagnosis of *lipomi episacroiliaci* [34]. Currently, ultrasound examination is an accessible technique for diagnosis.

By the beginning of the twenty-first century, knowledge of this condition was largely forgotten. The condition of painful fatty nodules has diminished from once being a topic that was widely discussed and at the centre of a medical controversy, to utter dismissal of the patient’s pain as being sourced by these nodules, even if the patient reportedly believed that the nodule was causing their low back pain.

OTHER RELEVANT AUTHORS

The question of the original describer of a medical condition is, for many, an important one. Many articles refer to Ries, from Chicago, as being the first to publish on nodules in 1937. However, our review revealed that many other researchers studied these perplexing nodules prior to Ries. Be that as it may, he was the first to use the term “episacroiliac lipoma” in a publication. He was intrigued by a patient with disabling refractory low back pain, whose pain resolved after the surgical removal of a painful fatty nodule in the sacroiliac area. He was so fascinated by this finding that he decided to examine 1000 backs randomly to discover more about these nodules. He found sacroiliac nodules present in 30% of studied cases [35]. Ries was not the only one intrigued. Two years earlier, in 1935, Sutro from New York had published a simple article labelling them subcutaneous fatty nodes. Nevertheless, he did not grant them clinical relevance [36]. At the same time in Europe, the nodules were also studied under other names related to what was considered chronic rheumatism [14].

Other authors were influenced by Ries’ research and his use of the term episacroiliac lipoma. MacDermot, from Canada, became curious about the nodules after Ries made a trip to Canada, where he shared his research with him. MacDermot showed considerable compassion in his article “Sacro-iliac lipomata”, in which he mentioned a woman with excruciating back pain who had previously been labelled as “neurotic” after many other treatments failed. He confessed, “To have given this poor woman relief after some 3 years of misery is one of the greatest pleasures that has happened to me in practice” [37]. Furthermore, Hittner asserted that overlooking episacroiliac lipomas (using Ries’ term) as a cause of low back pain meant that these patients were subject to prolonged pain, needless radiography, and unnecessary disc surgery [38].

Other authors, unaware of the previous literature, also believed themselves to be the first to publish. In 1952, Raymond described nine cases that underwent surgical removal, all with

good outcomes, except for a single recurrence. He named it “sacro-iliac lipomatosis” or “Herter’s disease” after Doctor Herter, who had introduced him to the existence of the nodules [39]. Much later in Serbia, Ercegovic et al., in 1982, presented himself as his first case. He suffered from intractable low back pain and could palpate on himself what he thought to be a kind of “synovial cyst”. His pain dramatically improved under local anaesthetic injection. After performing a biopsy of what they thought was a cyst, the researchers discovered its fatty nature. They named it “xanthoadipose nodules” in the sacroiliac region. Consequently, they treated more than 1000 patients successfully by local anaesthetic injection alone. Additionally, they utilized thermography to show an increase in temperature of the affected tissues [40].

VARIOUS NAMES OF THE SACROILIAC NODULES: THE “BACK MICE” TREND

The nodules have received many names throughout history. We have summarized the most popular ones in Table 2. Before the twentieth century, the presence of subcutaneous painful nodules was thought to be related to what was called muscular rheumatism. Thus, they were described as rheumatic nodules, effusions, or indurations in the soft tissue [41–43]. The researchers developed different theories, each with differing terminology. This led to chaos. The Spanish physician G. Marañón stated in 1933 that there were few problems in human pathology more obscure than those of muscular rheumatism due to the lack of objective lesions, the accumulation of theories, and the anarchy in the nomenclature; the descriptions of muscular rheumatism in French, English, and German books appeared to refer to entirely different diseases: *nodosités*, *fibrositis*, *myogelose* [44]. After Copeman and Ackerman’s study in 1944, the description of the nodules as herniation of the fatty tissue became popular [13]; Herz specifically introduced the term “subfascial fat herniation” [16]. Nonetheless, Copeman himself never used any specific term.

Rather, he simply attributed the nodules to non-articular rheumatism [14].

“Episacroiliac lipoma” and “back mice” are the most commonly used terms for lumbar nodules at present. Recent articles have used the former, introduced by Ries in 1937 [45, 46]. The term “lipoma” has detractors since, strictly speaking, these nodules are not usual lipomas [3]. Commonly, a lipoma is ordinarily considered to be a well-defined benign fatty tumour, mostly painless, with soft consistency, and slow growth beneath the skin [1]. In 1993 Curtis contributed a new term in his article “In Search of the Back Mouse”. The term “back mice” has been used since [3, 5, 7, 47, 48], and has become especially popular among some chiropractic professionals [49].

CLINICAL FEATURES ACCORDING TO RESEARCH

We have summarized the main clinical features of low back pain caused by these nodules (Table 3) according to Copeman’s contribution. Mostly, patients’ low back pain is related to what could be called pain of a “rheumatic nature”.

Turning the Page

We have presented a comprehensive historical review of studies on painful sacroiliac nodules, especially in the last 100 years. Our concern arose because recent publications focusing on ultrasound diagnosis have led to a resurgence of interest in this overlooked topic. In conducting our review, we have provided a detailed study of the papers of William Copeman, whom we consider to be a primary contributor. We have also summarized the articles by other researchers directly influenced by Copeman and Ackerman’s main article. Moreover, we have reviewed the work of other relevant researchers. The nomenclature of the nodules is confusing; thus, they have received many names throughout history. We summarized the main ones in a table to help the reader get a clearer picture of the various nomenclatures and their origins.

Table 2 A brief history of some of the names of the lumbar nodules

Rheumatic nodules, indurations, or effusions	Before the twentieth century, some authors described rheumatic nodules, indurations, or effusions related to what was called chronic rheumatism. They noted that the nodules or indurations could be found in many places, not just in the lumbar region. Froriep (1843) concluded that the indurations were due to effusions from the blood plasma to the cellular tissue; he coined the term <i>Hautzellgewebsschwiele</i> [41]. Stockman (1904) described it as hyperplastic fibrous tissue presenting a serous exudation [42]. Some Swedish and French authors used the term <i>cellulit</i> or <i>cellulite</i> to describe painful <i>nodosités</i> related to oedema on the cellular tissue. These “cellulalgic infiltrates” could sometimes be massaged away, they claimed, as Lagèze described in 1929 [43]. At present, none of these terms are used to describe this condition
Fibrositic nodules	Gowers, a well-known British neurologist, coined the term “fibrositis” in 1904 after suffering from lumbago. He theorized that the primary lesion in lumbago would not be in the muscular tissue itself, but in the fibrous tissue (hence the name fibrositis) that surrounded the muscle spindles, tendons, and aponeurosis [68]. The painful nodules, a common finding in fibrositis, became the fibrositic nodules. This term quickly spread and was commonly used, especially in England, for the first half of the twentieth century. Nevertheless, the term slowly fell into disuse and disappeared as evidence of inflammation (implied by the suffix -itis) was never found [10]
Muscular rheumatism or non-articular rheumatism	During the twentieth century, many authors emphasized that the origin of the painful lesions in chronic rheumatism was not always in the joints, but also in the soft tissue. Therefore, they used the terms “muscular rheumatism” or “non-articular rheumatism” [14]. They described the presence of painful trigger points, which were sometimes palpable as nodules. Copeman preferred the term “non-articular” rheumatism to “muscular” rheumatism after he performed the biopsies and learned that the basic lesion was not located in the muscle fibres but in the fatty tissue. He did not coin any specific name for the nodules
Episacroiliac lipoma	In 1937, this term was first used by Ries. At this time, he thought that this entity had not been previously described in medical literature [35]. His term influenced other authors, many of whom used similar terms: “sacro-iliac lipomata”, “ <i>lipomes épisacro-iliaques</i> ” in French, or “ <i>lipomi episacroiliaci</i> ” in Italian. This term is still in use today by some authors
Subfascial fat herniation	Even though Copeman was the first to describe the nodules as fatty hernias (1944), Herz introduced the term “subfascial fat herniation” in his article “Herniation of Subfascial Fat as a Cause of Low Back Pain” (1946) [16]. Copeman never used this specific term to describe the nodules, since the oedematous fatty lobules did not always show signs of herniation. Nevertheless, the term was popularized, and it is still in use today

Table 2 continued

Back mice	This term was popularized by Curtis in 1993 after his first publication, “In Search of the Back Mouse” [69]. According to him (personal communication by an email), he adopted this sobriquet from Dr Henry Wyatt, his instructor in London, who taught him that one of the characteristics of these nodules was their mobility under the examining fingers “like a scurrying mouse”. Curtis adopted the term to make it easy for medical students, doctors, and patients to explain this entity
Miscellaneous	“Copeman’s nodule” and “Copeman and Ackerman’s syndrome” are also terms that have been used due to Copeman’s influence on the study of the nodules [4, 32, 70]

We have also attempted to compile the main clinical features of this condition into a table to provide a clear outline for the reader.

There are numerous reasons why these investigations have been overlooked. As previously mentioned, the development of imaging diagnostic tools seems to have resulted in a loss of focus on palpation skills. As a result, what was once a common finding by physicians, the painful subcutaneous nodules, has become a strange finding for modern-day physicians, who rarely palpate patients’ backs thoroughly. Additionally, in the collective imagination of physicians, fatty tissue has never been considered a causative agent of pain, much less a cause of excruciating low back pain. Fatty tissue has traditionally been considered simply a tissue that just happens to be there and that is mostly harmless without relevant importance, particularly to pain.

Biopsy reports cast some, though insufficient, light on the pathology of these painful nodules. Grossly, the nodules were mainly described as normal fatty tissue or oedematous fatty lobules under tension or herniated. Underlying tissue tension was observed by some surgeons when the fatty lobules would suddenly protrude upon opening the wound deeply. They found either single nodules or many arranged by clumps resembling grape clusters. Some mentioned that the fatty lobules presented a thin fibrous capsule under tension that would easily break during surgery. Some nodules presented signs of protruding up through the underlying fascia, each clearly carrying its own blood and lymphatic supply through a visible

pedicle; they named these “pedunculated hernia”. Other times, the researchers did not find any sign of herniation. A few authors emphasized that increased tissue tension could cause ischaemia and explain the intra-nodule necrotic signs they occasionally found in severe cases. Microscopically, these fatty lobules were mostly reported as “normal adipose tissue”, although others reported signs of hyperplasia, fibrous growth, vessel congestion, and vessel wall thickness. Further research using new histological techniques may provide new insights into these apparently disparate findings.

Many researchers have reported that excisional biopsies result in pain relief for patients. Nevertheless, the disparity in both the gross and microscopic findings may have led to confusion, and many physicians were reluctant to consider that the fibro-fatty tissue the pathologist had labelled as normal could be a causative pain agent. Hench himself was puzzled by the presence of the nodules: “Sometimes pathologists reported no findings, whereas others reported histological findings but never any inflammatory signs” [17]. According to the surgeons’ observations, the tense fatty lobules lost signs of tension immediately upon being excised; thus, when the lobules were later examined by a pathologist, they were perceived as normal fat. The fact that these oedematous swellings could be difficult to recognize once removed provides an explanation for their dismissal as pathogenic agents. Copeman specifically described the needle teasing technique of the nodule to rupture the swelling and tension under the fibrous layers or capsules.

Table 3 Main clinical features related to painful lumbar nodules according to Copeman's view [11–14, 51]

Low back pain symptoms caused by fatty nodules

Localization	Pain is usually felt in an imprecise location in the vicinity of the sacroiliac joints, and the patient is often unaware that it may come from a painful nodule. Palpation upon the area may help the hesitant patient to better localize a specific nodule. Sometimes, its margins cannot be delineated and can only be termed a tender “spot”
Symptom chronology	Pain may begin insidiously without any apparent cause, or abruptly after a simple muscular contraction or strain of the back. The pain can last from days to years in a recurrent manner. For other patients, the pain begins locally yet radiates to other areas within days. Characteristics of the pain may change with time
Pain characteristics	Pain can be described as a dull constant ache, soreness, or stiffness. It sometimes presents as mechanical pain. In the worst cases, it is suffered as a sharp, incapacitating pain. It is often associated with gluteal or leg numbness. The severity of the pain varies widely over time. Unexplained fluctuations over days, weeks, or months are typical
Palpation	Deep palpation with the fingers increases the nodule's pain and may trigger radiated pain in certain areas. No inflammatory signs can be felt, although an entire area may be swollen. At times, back muscle spasms may be associated
Referred pain	When it occurs, pain may be referred to the gluteal area, hip, lateral thigh, or down the leg—and in certain cases, to the abdomen or groin. It can be triggered upon nodule palpation, by certain positions, or spontaneously
Aggravating or relieving factors	
Motion influence	Pain worsens with trunk extending, bending, or twisting (for example, when getting up and down from a bed or chair). Turning in bed is also commonly reported as painful and can even wake the patient. Back muscular spasms may lead to total limitation of motion
Immobility influence	Pain and stiffness may worsen after periods of immobility, such as sleeping or being bedridden. Some patients report difficulty in the morning, which improves during the day as they move
Response to exercise	Soft exercise may lead to symptomatic improvement, although pain worsening after vigorous exercise or overwork may be reported
Weather influence	Many patients report pain exacerbation which they associate with falling atmospheric pressure or rising humidity. Many report aggravation in the autumn and winter seasons
Response to heat	Dry heat or warm baths may give temporarily pain relief
Response to compression	Compression by the hand, an elastic back brace, or strapping tape may give pain relief and comfort
Response to massage	Nodules can become very painful by massage or being rubbed. Some patients note improvement after certain massage therapies, despite the massage itself initially being uncomfortable or painful. Still, others cannot withstand the pain during massage or it may even worsen
Response to painkillers	Mild pain responds to non-steroidal anti-inflammatory drugs (NSAIDs), but severe pain may not respond to any medication, not even to opioids

Furthermore, researchers hypothesized that sudden fatty herniation could explain acute lumbago. Copeman suggested that the tense fatty tissue could herniate through neurovascular holes of the fascia, causing acute nerve entrapment. For example, sudden fatty herniation in the lower back may cause acute lumbago by abruptly pinching the superior cluneal nerve, whereas persistent compression may cause chronic cluneal neuropathic pain, commonly occurring above the iliac crest as the nerves cross an osteofibrous tunnel [50].

Surprisingly, even though researchers demonstrated that fatty tissue could be a causative pain agent and treatment options were suggested with good outcomes, this knowledge continued to be neglected by mainstream medicine. Copeman, in his 1949 article for the *British Medical Journal*, stated, “If the observations I here put forward are correct, we are now in a position to turn over a fresh page so far as our conception of certain of the so-called rheumatic syndromes is concerned.” By then, he was convinced that at least fibro-fatty tissue should be considered and studied for its role as a pain agent in certain rheumatic ailments. Unfortunately, that page was never turned [11].

The trend that started in the 1950s toward considering low back pain as being caused primarily by disc disease or osteoarthritis may have played a role in neglecting other possible causes, such as fatty nodules. Copeman summarized all of his findings about these nodules in chapter XVIII titled “Non-articular Rheumatism” in the then well-known *Textbook of Rheumatic Diseases* (in 1969, he published his fourth edition, only 1 year before his death) [51]. Oddly, and unfortunately, this chapter was completely omitted in the fifth edition re-edited by Scott after Copeman’s death. Another chapter was substituted for it and titled “Back Pain Spondylosis and Disc Disorders”, which was unexpectedly also included in section X titled “Non-articular Rheumatic Disease” (although disc disorders are an articular rheumatic disease) [52]. This omission of the chapter about fatty tissue was probably a consequence of the twentieth-century trend toward relating the majority of low back pain syndromes to spinal disorders [53, 54]. The subsequent tendency to

rely so strongly on radiological imaging for back pain diagnosis caused some patients to be misdiagnosed and undergo unnecessary disc surgery. The lack of radiological pathological findings also led some physicians to label certain patients as neurotic when X-rays showed negative results [37]. In addition, the coexisting presence of osteoarthritis and discopathy in the same patients with painful nodules (not an uncommon finding, according to the researchers) may have created confusion. This coexistence could be a mere coincidence or could be relevant aetiologically. Perhaps the disc and the fatty tissue respond to the same stimuli to become oedematous and tense, both becoming more likely to herniate; however, this interesting hypothesis requires further study.

The argument that sacroiliac nodules could be a relevant source of low back pain has had many detractors. The very existence of nodules was questioned by some professionals. Hench explained the scepticism among some American physicians, saying, “The *fibrositic nodules* as being accessible only to the fingers of faith” [17]. Although some authors warned that the nodules were better palpated using lubricating liquid, many doctors did not do so and thus doubted the very presence of nodules. Two other factors contributed to this nihilism. Pathologists sometimes reported their findings as normal fat; additionally, many nodules were both painless and non-tender (and thus asymptomatic), which led to some mocking. Cyriax, a known English orthopaedic physician, called the nodules “innocent little swellings”, and he thought that “it merely so happens that pain and tender fat deposits are both common there” [55]. Other researchers interpreted (since they did not perform biopsies) that the palpable nodules were placed in the muscular fibre itself, and they developed theories that later became known as “myogelosis” or “myofascial pain syndrome” [56].

In the history of medicine, the chaos surrounding the nomenclature of many conditions has hindered the progression of knowledge. In our subject of study, the issue of proper nomenclature is particularly chaotic. As an example, the terms “fibrositis” and “fibrositic nodules” went from being one of the most

popular terms used by English physicians in the past to being a largely unknown term among modern-day physicians [10]. Once the absence of inflammatory signs was microscopically proven, the term fibrositis was shown to be inaccurate and eventually fell into disuse among the medical community. Unfortunately, as the term was pushed aside, so was the research and knowledge of the condition. Other terms underwent conversion, such as the French *cellulite*, which is now simply used for an unattractive surface appearance of the skin and fat. Its original meaning had been “painful swollen cellular tissue” [57–59]. We anticipate that the nodules will not receive a definitive proper term until the aetiological causes of the painful nodules are fully understood, and mainstream medicine is finally aware of their existence and relevance.

Copeman related the nodules to what he termed “basic fat pads”. He loosely defined the latter as slightly pink fat deposits in well-defined areas of the body, which could be found in even the most wasting bodies. He complained that these fat pads were neglected in anatomy textbooks. Although they are still overlooked, the recent tendency to study the fascial layers may provide new insights into Copeman’s basic fat pads, which have been coined DAT (deep adipose tissue) in anatomy atlases [60]. New histological techniques could confirm whether these basic fat pads are related to brown fat and thus to body thermogenesis [61, 62]. Copeman pointed out in 1943 that in certain pyrexial illnesses, these pads became tender through oedema and in some instances could be seen bulging from beneath the skin.

Furthermore, he noticed that the oedema could disappear or remain in a latent asymptomatic state in the form of palpable nodules once the fever resolved. He theorized that the neo-formation of some nodules could result from fatty oedema during certain febrile diseases, which were typically suffered early in life and may lead to problems in adulthood [12]. Interestingly, according to many researchers, patients reported worsening pain under certain weather changes, specifically increased cold and humidity. If these observations are both confirmed as true, it could warrant further study of

the association between nodules and brown fat. Thus, the influence of factors related to body thermogenesis (fever and weather changes) could explain some “rheumatic pains”.

The nature of the oedema of the nodules and their somewhat ephemeral quality remain a mystery. The nodules could be the result of a circumscribed tense accumulation due to oversupply or impaired local drainage of normal interstitial lymph in the deep fatty tissue, which is trapped under unyielding fibrous walls, possibly due to herniation. Curiously enough, the “fathers of medicine”, including Hippocrates and Galen, considered that the excess or deficiency of any of the “vital bodily fluids or humours” could lead to illness and pain. In treatises from the past, chronic rheumatism was considered an accumulation of a humour that needed to be released.

Some authors have described a generalized pain syndrome among women with multiple painful nodules or spots. The worsening of the pain with menstruation and menopause led them to speculate that sex hormones may play a role with this condition [32]. Copeman described this as “fluid retention syndrome” that presents with deep fatty oedematous tissue under tension [11]. This could lead to generalized pain and rigidity, as observed in what is now called fibromyalgia syndrome. It is worth noting that a previous term for fibromyalgia syndrome was “primary fibrositis”, and early papers did mention the presence of painful nodules. Later, in the 1990s, they coined the term “fibromyalgia”, and they focused solely on painful spots as the main clinical feature (entirely omitting the possible presence of palpable nodules) [63, 64].

Research on these fatty nodules requires critical thinking that extends beyond pain in the low back. We emphasize that considering fibro-fatty tissue as a causative pain agent may not only lead to a shift in thinking about non-specific low back pain, but could also promote further consideration of other unexplained pain syndromes, such as high back pain or neck pain. In her book *Pain*, Marni Jackson wondered, “Hasn’t anyone noticed the embarrassing fact that science is about to clone a human being but still can’t cure the pain of a bad back? [65]”

Back pain is still a major health problem despite all advances, just as it was a century ago. Perhaps, in Chesterton's words, "It is not that we can't see the solution. It is that we can't see the problem." Copeman also noted that sacroiliac nodules could be only one presentation of a condition that can occur in many other body regions. He considered that oedema in the fibro-fatty tissue could present itself as palpable nodules, strands, indurations, or just painful spots, depending on the anatomical region in which they occurred (lumbar, dorsal, neck, or knee).

Copeman wondered if the study of fibrositis and fibro-fatty tissue was neglected because of its "lack of glamour" [14]. Certainly, upon performing this review, we are led to believe that the anatomical, histological, and metabolic complexity of adipose tissue presents a substantial challenge, not simply its lack of glamour. Perhaps the recent trend toward studying brown fat could shed light on the proper knowledge of this tissue. A final point is that the medical community appears to be shifting from the perception that adipose tissue has only storage and protective functions [66].

In conclusion, many questions remain to be answered in the study of these nodules, and various methods are available to address these questions. For example, the development of new histological techniques related to brown fat may provide new insights into the pathology of these fatty nodules. Additionally, oedematous fluid could also be collected and further characterized. This will lead to a more complete understanding of its composition, which is essential to discovering why it may accumulate. Another method requiring further development is imaging; for example, the results from MRI might allow visualization of the degree of oedema or tension within tissues. Lastly, better anatomical knowledge of the peripheral nerves—and the locations where they could be trapped by tissue compression or herniation—could lead to improvements in diagnostic techniques prior to performing nerve blocks or releases (for example, the occurrence of the superior cluneal nerves becoming entrapped, likely as they cross the osteofibrous tunnel above the iliac crest) [67].

CONCLUSION

We began this study in 2017 because we were intrigued by a rather simple clinical finding: the palpation of painful sacroiliac nodules in patients with low back pain. After investigation, we agree with Copeman that the nodules could be a clinical sign of a more complex entity, a variety of painful ailments (not only low back pain), which could be related to fatty tissue tension and herniation. When addressing a conundrum as complex as this, it is crucial to start at the beginning, "thinking out of the box". We must begin again by reviewing the existing literature and taking into account the theories from researchers throughout the history of medicine. After all, their findings are a foundation of knowledge that should not be dismissed but perhaps reconsidered from a new perspective. Copeman aimed to turn a new page in the study of certain conditions by considering fatty tissue as a causative pain agent. After reviewing his work and the work of many others, we think that it is time for that page to be turned.

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