Summary
The cost of back pain in terms of morbidity and fall in income to patients, and loss of manpower to industry is remarkably high: it has been estimated that half the population has or has had backache. Thus a simple and efficacious treatment has been much sought after.

A series of 115 patients with chronic backache seen in general practice over a period of 10 years was reviewed. They had all been treated with injection of corticosteroid in lignocaine to tender spots on the back. The men showed a progressive incidence of backache to their fifties, with reducing incidence in retirement, while the women had an even spread through all ages from puberty. The proportion responding to treatment was similar for all age groups and was unrelated to length of history. A good response to injection was reported by 54% of patients overall, but this was reduced to 41% if prolapsed disc had been diagnosed on x-ray.

A second series of 57 patients with backache was investigated on a single-blind, randomised, controlled basis. Three groups were compared: lignocaine injection only, lignocaine with triamcinolone acetonide, and lignocaine with methylprednisolone acetate. There was no statistical difference between the two forms of corticosteroid, but there was a significantly greater benefit (p=0.001) from corticosteroid injection to tender spots in the back than from lignocaine injection alone.

Key words
Back pain, Clinical series, Corticosteroid injection of tender spots, Randomised controlled trial, Trigger points.

Introduction
Backache is commonly due to connective tissue lesions. This article describes treatment by local injection of corticosteroid to painful tender lesions in the supporting and activating structures of the spinal column, rib-cage, scapulae, pelvis, and hips. Tender lesions which respond to local injection of corticosteroid have been described as trigger points.

Backache was the presenting symptom in one-third of all patients seen in an orthopaedic clinic and it has been experienced at some time or other by half the population. The cost to Britain of absenteeism due to pain is 35 million working days per year, with a high proportion due to backache, and the annual cost to the British National Health Service of back pain has been estimated as £481 million (1). Twenty-seven per cent of a sample of 5249 males aged 40-49 were interrogated on the subject of low back pain. Of the many variables studied, there were disappointingly few that could be shown to predispose to low backache. Tall men and heavy lifters were slightly more at risk, and a greater incidence was found in subjects having signs of chronic bronchitis or arteriosclerosis. Prolapse of an intervertebral disc was found on x-ray in 22% of backache patients. It has been suggested that the upright posture adopted during the phylogenetic development of mankind is a prime cause of the mechanical weakness of the human back, although back pain is well known in certain four legged animals and is a common cause of bad behaviour in horses (2,3).

There are said to be three types of woman: those who have had backache, those who have backache and those who are going to get backache. As this applies almost equally to men, backache is clearly important in daily medical practice: it forms 7% of all consultations in general practice and is the main cause of disability in the UK, affecting 1.1 million people (4,5). In selecting a universal complaint, low back pain must be a prime contender; it affects both sexes and any class or race with fine impartiality.

Patients fall into two groups: those in whom a firm diagnosis based on x-rays can be made and,
more numerously, those labelled as having non-specific backache, lumbar fibrositis, or postural muscular backache. Because of the difficulty both of diagnosing and of curing backache, its mention at any gathering of doctors is sure to evoke a chorus of groans and sighs, often from fellow sufferers. In both groups disappointment and frustration are all too common, even after prolonged and skilful treatment: apparent cure is so often followed by relapse.

The intervertebral discs and joint facets may degenerate painlessly as part of normal aging, so reliance on radiographic changes may result in incorrect clinical diagnosis and treatment. Causes of non-skeletal chronic backache include injury strain and rheumatic inflammation affecting one or more of the layers of soft tissue around the spine, the posterior chest wall, flanks, and buttocks. Conditions associated with chronic backache include post-herpetic pain, panniculitis, trapped nerve, strain of the deep fascia, fibromyositis, intercostal fibrositis, muscle and tendon strain, and scar tissue at any level (6).

A wide variety of therapeutic measures all seem to offer success in about 30 per cent of cases, suggesting that there may be common factors contributing to the beneficial effects of apparently unrelated treatments. However, this hope is tempered by the results of a comparative trial of four methods of treatment: aspirin, definitive physiotherapy, manipulation, and a surgical belt, in which poor results occurred equally.

**Structure of the back**

The lumbar spine and sacro-iliac region are usually the main concern of the therapist. When prolapsed intervertebral disc has been ruled out, the clinician is faced with a structure comparable in complexity to an Eiffel Tower which is jointed and unstable, with its water and electrical supplies at risk from compression and disruptive accidents. The spine is a column of articulated bone segments held together by more or less elastic ligaments. It is twisted in all directions by a variety of muscles and the pull of gravity, and has nerves and blood vessels which are vulnerable to excessive compression and distortion.

Muscular over-action, direct or indirect injury, inflammation, or toxic poisoning may be the cause of non-specific backache. When a fibre of muscle or ligament has been ruptured or avulsed from its attachment it will become a nidus of inflammatory reaction. Blood exudes from torn capillaries, white blood cells migrate into the lesion, and nerve fibres are compressed by oedema or suffer chemical irritation. The lesion may be replaced by regrowth of muscle fibres or scar tissue. In other parts of the body injured tissue may be kept at rest while the patient goes about his business, but a back injury patient is under stress as soon as he moves.

The sacro-iliac joint is not seen to move by the clinician, nonetheless it does have an appreciable range of movement. The posterior ligaments interweave in all directions between the sacrum and the iliac bones, stabilising the joints. Rotational movement is partly limited by wedging of the sacrum between the iliac bones, but mainly by the tensile strength of the sacro-iliac ligaments; fibrositic lesions can occur in the deep cleft which separates the bones.

**Anatomical considerations**

The back is defined as the area bounded by the spines of the scapulae, the posterior axillary lines, and the creases of the buttocks. The structures which should be borne in mind when examining a patient with backache include the skin, subcutaneous tissue, emerging cutaneous nerves at the deep fascia, the deep fascia itself, muscle, tendons and muscle aponeuroses, and interosseous ligaments (e.g. sacro-iliac, interspinous, intervertebral). When there is a circular or oval area of hypersensitivity around a most tender spot, trapped nerve syndrome is the probable cause of pain.

The nerve supply to the skin of the back derives from the cutaneous branches of the dorsal rami of the spinal nerves. These nerves have a fairly constant distribution, piercing the muscles and fasciae of the region (Figure 1). However, the

*Figure 1. Superficial nerve supply of the back.*
dermatomes of the spinal nerves overlap widely, hindering accurate diagnosis of the spinal level affected.

Accurate location of the lesion is important for effective treatment of backache with local injection of steroid. Hyperaesthesia of the skin may accompany backache and neuritis may be present. The nerve supply to an area of the skin may be affected at any level from the spinal cord to the skin: for instance, nerves which pierce the deep fascia are subject to compression at the point of emergence into the subcutaneous tissues. The trapped nerve syndrome is well known in the lateral cutaneous nerve of the thigh and over the rectus abdominis muscles, but it also occurs in sensory nerves which pierce the deep fascia of the back. The pain of fibrositis can usually be found to originate in localised trigger-points (7), where there may be isolated groups of muscle fibres in spasm.

Deep muscle tenderness is often associated with tenderness of underlying periosteum: pain is severe when muscle fibres are torn from the periosteum. A lesion at the transverse process of a vertebra is difficult to locate. Tears or avulsions of the sacro-iliac ligament are more easily localised: a curious fibro-fatty swelling is often found in this region and there may be tenderness at the sites of pain down both sides of the sacrum and coccyx; there is a row of emergent nerves parallel to these edges, which are subject to the trapped nerve syndrome.

There was no clinico-pathological correlation with x-ray appearances in the lumbar spine in a large series of backache sufferers with normal controls. Of 2,000 patients with backache seen at the Mayo Clinic, 22% had radiological evidence of prolapsed intervertebral disc.

The "neurotic" patient
A patient who has been told that nothing more can be done for his backache after having persevered through a series of treatments only to be advised that *What can't be cured must be endured*, may well develop feelings of frustration and depression. Sometimes this reactive depression, especially if there are side-effects from drug therapy with analgesics and tranquillisers, is then ascribed to a *neurotic personality* and referral is made for psychotherapy in the hope that this will alleviate the pain. The stigma of referral to a psychiatrist is distressing to the patient and a burden to his family, and the psychiatrist is at a disadvantage in that he must rely on the diagnosis of the referring specialist who may consider the patient's pain to be trivial.

Empathy is essential to sustain the patient through what may be years of suffering and to avoid therapeutic martyrdom. Cure of pain of fibrositic origin is dramatic in this context, and even in the absence of cure a positive diagnosis of fibrositis is reassuring to the patient.

**Standard treatments**
Most patients are treated with various of the standard regimes such as massage, heat, manipulation, acupuncture, physiotherapy, orthopaedic belt, bed rest or surgery until success is achieved or the patient is declared incurable. The local injection of corticosteroids to tender spots is part of this continuous process of differential diagnosis and treatment. It involves palpation to localise tender spots associated with the painful area, and injection of *triamcinolone acetonide* suspension mixed with 1-2ml of *lignocaine* solution into the centre of the most tender spots found. In general 0.25-0.5ml of the suspension is sufficient to each point. The technique is described in detail in a previous paper (6).

If injection treatment fails, the diagnosis should be reviewed again and further methods of treatment considered. In some cases repeated search may reveal prolapsed intervertebral disc, secondary metastatic cancer or osteoarthritis, and pain may be referred to the back of the chest from carcinoma of the lung, or aortic or coronary disease.

**Treatment of back pain with local injection of corticosteroid: a retrospective survey of a series of 115 patients suffering from chronic backache**

**Method**
Over a period of 10 years (1964-74) 115 patients were treated in an Essex general practice by local injection of a small volume of *triamcinolone acetonide with lignocaine* mixture to painful tender lesions in various parts of the back. In all cases backache had been present for more than 5...
weeks, and most patients had already been treated by routine methods.

Patients with renal, abdominal, or spinal disease were not necessarily excluded from treatment if it was considered that pain might be lessened by injection of tender lesions in the back, but patients on anticoagulant drugs were not injected, and caution was exercised in diabetics.

**Technique**

Assessment and grouping was according to prearranged criteria. After routine history taking and clinical examination the patient stood with his back to the examiner or lay in the prone position. He was asked to indicate with one finger the site of maximum pain, and a mark was made at that place with a biro or skin pencil. A search was then made, in the manner described previously (6), for the exact site of the most tender spot or area of hyperaesthesia associated with the pain, and the findings were noted on a sketch of the part of the back affected. The depth from the surface and the likely stratum of the lesion was sought by pinching the skin and subcutaneous structures at increasingly deeper levels. If this manoeuvre failed, the exact depth of the lesion was sought by searching with the needle-tip during injection of triamcinolone acetonide with lignocaine mixture, guided by the patient's assessment of maximum pain.

**Results**

There were 52 men and 63 women in the series (Table 1). The men showed a progressive rise in incidence up to their fifties, with a lesser incidence during retirement, whereas the women suffered from puberty through the child-rearing years to old age (Figure 2). Pregnancy, baby-lifting, shopping and household chores are risk factors, and in middle and old age housework remains a factor. The proportion of good, fair and bad results was the same in all age groups.

Analysis of patients' length of history shows that equally good results were obtained however long a patient had suffered (Figure 3) and were the same for sacroiliac pain as for other parts of the back. Other instances were classifiable by history and examination as injury to ligament or muscle fibres. Comparison of the results in three groups according to position and cause (Figure 4, Table 2) show that the proportion of good, fair, and bad results are similar for treatment of all parts of the back, although the results were less successful in patients diagnosed on x-ray as having a prolapsed intervertebral disc: good results were recorded in 9 (41%), fair results in 4 (18%) and bad in 9 (41%), but good and fair results were more frequent than would be expected if the diagnosis had been correct in all of these cases: 22 out of the 115 patients with localised tender lesions had radiologically demonstrable intervertebral disc lesions without evidence of root pressure, but 59% of them were relieved of pain by local injections. This supports the contention that x-ray evidence of prolapsed disc is not conclusive evidence of the site of backache.

Comparison of the results of corticosteroid and lignocaine injection therapy in the 115 patients with backache with a series of 188 patients with

![Table 1](attachment:image1.png)

**Figure 2.** Incidence of backache according to age and sex for a group of 115 patients.

![Figure 3](attachment:image2.png)

**Figure 3.** Results of treatment of 109 patients with backache using local injection of corticosteroid.
Figure 5. Comparison of results for injection of tender points with triamcinolone in backache and non-backache patients.

Table 2
COMPARISON OF RESULTS OF CORTICOSTEROID INJECTION TO TENDER POINTS IN SACRO-ILIAC REGION WITH OTHER PARTS OF THE BACK

<table>
<thead>
<tr>
<th>Part of back</th>
<th>n</th>
<th>Results</th>
<th>Good</th>
<th>Fair</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacro-iliac</td>
<td>82</td>
<td></td>
<td>51</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>Other areas</td>
<td>33</td>
<td></td>
<td>52</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Disc degeneration</td>
<td>22</td>
<td></td>
<td>41</td>
<td>18</td>
<td>41</td>
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<tr>
<td>Total</td>
<td>115</td>
<td></td>
<td>54</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

Figure 7. Distribution of 239 tender points in a series of 109 patients with backache. The sacral lesions were not discrete as shown, but were concentrated along the sacro-iliac joints.

Figure 8. Distribution of tender points in a series of 82 patients with backache.
pain elsewhere in the body shows that slightly better results were achieved in the latter group (Figure 5), but in another series of 43 patients with backache the results were substantially better, with a 68% excellent response to corticosteroid and lignocaine injection of the tender spots (Figure 6).

A composite sketch (Figure 7) of 239 tender spots found in 109 patients shows that the sacroiliac ligaments are the only sites that are particularly prone to fibrositis and fibromyalgia. The same is seen to be true in a diagram (Figure 8) of tender points found in a further series of 82 patients with back pain (Table 3). Some of the lesions in different patients were clinically at identical spots in the sacro-iliac region, but they are shown separately for illustrative purposes. It was evident from my records that the lesions are randomly scattered, and seldom occur at exactly the same site when recurrences occur in the same patient. This suggests that healed lesions are seldom involved in recurrent painful episodes. Subsequent lesions in the same area are likely to be adjacent to the sites of previous tender spots.

Many of the corticosteroid/lignocaine injections were made at more than one level at the affected site, for instance to the deep fascia and the underlying muscle, or to deep muscle and the adjacent periosteum or fascia. The smallest estimated volume of the mixture consistent with the area of tenderness was used; blunderbuss injection with large volumes was avoided. The average total dose per patient during the research period was 44mg of triamcinolone acetonide. Each patient was seen 5 weeks after treatment: none had suffered any ill-effect apart from a temporary faintness after injection in a few who were prone to fainting. In most cases there was pain at the site of injection for a day or two.

**Case histories**

1. A housewife aged 59 had been seen with back pain in general practice over a period of 8 years (Figure 10). She had previously been

![Figure 9. Results of three forms of injection treatment in a group of 57 patients with backache.](#)

![Figure 10. Trigger points used in the treatment of Case 1.](#)

<table>
<thead>
<tr>
<th>Total</th>
<th>Age</th>
<th>Cause</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strain</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accident</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>48</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>41</td>
<td>41</td>
</tr>
</tbody>
</table>

**Table 3**

<table>
<thead>
<tr>
<th>ANALYSIS OF RESULTS OF CORTICOSTEROID INJECTION TO TENDER POINTS IN A SERIES OF 82 PATIENTS WITH BACKACHE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Number with sacro-iliac pain: 49. Number with posterior chest wall, scapula, thoracic spine, loin, lumbosacral joint, or buttock pain: 33.
treated for fibrositis of the right buttock, had had a colectomy with colostomy and had been operated on for disc lesions (with poor result). She had developed painful tender lesions of the right shoulder and deltoid regions. Corticosteroid with lignocaine injections into the tender points A-D cured the pain. Two years later injections were given to trapped nerves in the left buttock (E,F) with good results. She then complained of pain and tenderness in the right buttock involving scar tissue. Injections to the tender lesions G-M were successful, and when seen a year later she was still free from pain.

2. A male Remploy employee, aged 60, suffered two prolapsed discs when he lifted a heavy table at work. He was awarded a lump sum in compensation and was taken on at the Remploy factory where I saw him. He started work in the book-binding section, but could not stand or sit for long periods. Over the next 3 years I treated him with local corticosteroid and lignocaine injections to the sites shown in Figure 11. Initially injections at A-C resulted in a worsening of pain, but a second treatment with injection at D and E gave full relief. A few months later he complained of angina which was helped by sublingual glyceryl trinitrate and steroid injection to a point on the sternum. All was well for two years until he developed neck pain which was settled by injection to tender points F-H. He was well at the time of his retirement from the Remploy factory a year later.

3. A dustman, aged 46, had suffered from chronic backache since the age of 19 when he fell down the hold of a ship and fractured his spine and pelvis. When he was 26 he again fractured his pelvis when he fell from a scaffold. More recently, when x-rays were taken at the age of 42 no sign of the fractures was visible. His backache was diagnosed as strain of the left sacro-iliac joint and he was treated with physiotherapy and a surgical belt. I found him to have tenderness of ligaments over the left sacro-iliac joint and there was evidence of trapped lateral cutaneous nerve of the left thigh. Injection of corticosteroid and local anaesthetic at tender points A-C (Figure 12) appeared to cure the pain at both sites.

### Treatment of chronic back pain comparing corticosteroid and lignocaine injections with lignocaine alone: a single-blind trial

#### Method

A randomised, controlled, single-blind trial on a series of 57 patients at the Backache Clinic of Oldchurch Hospital, Romford between 1978 and 1980 was devised to compare the results of injecting mixtures of triamcinolone acetonide with lignocaine, or methylprednisolone with...
lignocaine, or lignocaine alone. The patients were referred with chronic back pain to the backache clinic at the general hospital by consultants and general practitioners in the Havering District. It was not possible to arrange a double blind trial because no harmless milky substance resembling the therapeutic suspension was available for injection to controls, but validity was assured by preparing each injection in a corner of the treatment room with the physician's back to the observer colleague and nurse, while the patient faced the opposite corner. The hospital pharmacist prepared envelopes containing randomised proforma numbered from 1 to 100.

The history, physical signs, radiological and laboratory data and previous treatment were recorded in each case. Patients were told that the trial was designed to find out which of three substances gave the best results in the treatment of backache. Twenty per cent of patients treated with lignocaine alone asked that treatment be stopped, while patients treated with corticosteroid tended to ask that other sites be injected, thus prolonging the period of treatment. The injections were given at two-weekly intervals because the clinic was held every two weeks. For the same reason, provisional assessment of results was arranged for two weeks after the last injection.

At the first session one of the numbered envelopes was opened and details of the injection to be used were taken from the randomised proforma. Patients were randomly allocated to one of three treatment groups. Those in the first and second groups were treated with different long acting corticosteroids plus lignocaine, the first group getting triamcinolone acetonide (Adcortyl) and the second getting methylprednisone acetate (Metrone), while those in the third group were treated with the local anaesthetic alone. The average total dosage of triamcinolone used in the first group was 31mg.

The technique used for eliciting tender spots and for their injection was as already described (6). In some cases the lesion was found to be deep, on or near the posterior aspect of the vertebral column, and a 2 or 3in needle was required to locate the exact site of pain.

Two weeks after the last treatment the patient was presented to the blinded assessor: history and treatment were discussed, the patient re-examined, and the result of treatment recorded. A follow-up questionnaire was sent to each patient six months after treatment.

Results
At the end of the trial period the assessor's comments on the 57 patients were analysed to give the results of treatment (Figure 9). On the advice of the statistician the fair results were omitted from the statistical analysis and results for the two forms of corticosteroid were combined: thus comparing corticosteroid plus lignocaine with lignocaine alone using the chi squared test gives a probability p = 0.001 which is statistically significant, showing that the addition of a corticosteroid to the lignocaine when injecting tender spots in the treatment of back pain gives a greater likelihood of successful pain relief. The lignocaine plus corticosteroid groups had an average treatment period of 3.1 weeks. Triamcinolone was slightly, but not significantly, more effective than methylprednisone (Figure 9).

Discussion
The value of corticosteroid injection therapy is that cure appears to be permanent in a considerable number of cases and recurrences in the original area are easily treated. Temporary cure convinces the patient that the pain is in soft tissue and of no sinister import. But one must consider the problem of recurrence of pain after apparent cure, as some patients refuse a second course of treatment because they are averse to the pain of the injection. The clinician needs a range of alternative therapies to offer patients should local injections fail, but psychiatric treatment alone is a very unattractive last resort. If the symptoms become progressively worse in spite of treatment the diagnosis should be reconsidered.

Conclusion
The injection of corticosteroid suspension in local anaesthetic into tender spots associated with painful musculo-skeletal disease has been shown to be of help to the sufferer (8-10). This is now demonstrated to be true also for backache.

The incidence of backache in men increases progressively up to the age of 50 while women suffer from teenage years to old age, but the level of improvement with corticosteroid injection was similar in all age groups and both sexes. The response did not vary with length of history of backache, nor by the position of pain in the back. However, injection therapy was less successful when a prolapsed intervertebral disc had been diagnosed. The most common site to find tender points was the sacro-iliac area.

Two types of insoluble corticosteroid have been used for injection together with lignocaine into
tender spots: triamcinolone acetonide and methylprednisone acetate. No difference was found between them in the degree of benefit obtained, but the improvement in back pain with either is statistically significantly better than with lignocaine alone.

The late Dr IHJ Bourne MBE MD FRCPG
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References

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Email: B.Wider@exeter.ac.uk

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Clare Stevinson (Exeter University) will present Depression and Premenstrual syndrome

Dr Chaand Nagpaul (Harrow East and Kingsbury PGC) will discuss using the presented evidence for making clinical and commissioning decisions

Dr Max Pittler (Exeter University) will present Intermittent claudication and Benign prostatic hypertrophy

Dr Adrian White (Exeter University) will present Headache and Irritable bowel syndrome

Dr Derek Chase (Marylebone PGC) will discuss using the presented evidence for making clinical and commissioning decisions

Dr Roy Welford (Glastonbury) will discuss applying the evidence in practice and

### References
Tender point injection of corticosteroid in the treatment of backache

IHJ Bourne

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