SARAPIN

A regional Analgesic for control of pain of neuralgic origin.

For almost two centuries it has been known that the distillation of a suspension of powdered Sarracenia purpurea (Pitcher Plant) in alkaline solution produced a volatile base. In 1931it was observed by the late Dr. Bernard D. Judovich in what was known as the Intercostal Neuralgia Clinic of the University of Pennsylvania Graduate Hospital, that the distillate prepared in this manner was of value in relieving pain of neuralgic origin. Since that time, as a result of extensive chemical, pharmacologic and clinical investigation, a product of uniform proved potency has been derived and marketed under the name SARAPIN. It is difficult to explain the exact mechanism of the analgesic property of this unique product, just as previously the mechanism of the analgesic action of ASPIRIN was unknown. But we do know SARAPIN® has been used for more than fifty years in treating the scope of pain arising from muscular or neuralgic origin, and in all this time we have never known of a drug induced idiosyncrasy or untoward result. SARAPIN® is not only a useful tool for the physician, but is safe to use.

HISTORICAL BACKGROUND

Following the observation that an aqueous solution derived from the pitcher plant was of value in relieving pain of neuralgic origin, the drug was used on a series of several thousand cases, and it became apparent that the preparation acted through its effect on sensory nerves, relieving neuralgic pain without change in skin sensation and having no effect on motor nerves. Bates and Judovich state[1]: *"In no instance has there been any motor weakness following injection of peripheral nerves, nor loss of touch, pressure, pinprick and temperature sensibility."* Controls with procaine, saline and water showed prolonged duration of effect in favor of the pitcher plant preparation. Toxicity tests revealed that it was harmless and no evidence of tissue coagulation or sclerosis could be found. As stated by Bates,[2] *"Controls of novocaine, saline and water were used, and the results recorded. The key numbers of these various ampoules were changed several times, and on analysis in each series, it was found that SARAPIN produced prolonged relief in contrast to fleeting or negative results with the other solutions. In a number of instances, patients who had been injected with novocaine, with only a short period of relief of pain, obtained prolonged relief by a subsequent injection of pitcher plant distillate."*

In an attempt to explain this action, the cathode ray oscillograph has been used to investigate the effect of SARAPIN on the action potentials of the saphenous nerve of the cat[3]. The nerve was mounted in a nerve chamber in an atmosphere of 5 percent carbon dioxide and 95 percent oxygen and maintained at a temperature of 37.5^{o} C while being bathed in the solution under examination. Recordings made of the action potentials showed that after about five minutes immersion in Sarracenia distillate, the maximal A spike was somewhat reduced while the C fiber potential was completely obliterated.

Early workers, in an attempt to discover the exact nature of the volatile base obtained in the distillation of Sarracenia root, reported the only identifiable product to be the ammonium ion. Pharmacologic investigations which followed disclosed that aqueous solutions containing ammonium ions did possess activity closely related to that of SARAPIN.

In a clinical study involving eight cases of sciatic pain, injection at the sciatic notch with ammonium salts produced no change in surface temperature as determined by thermo-couple readings before and after infiltration.1 Normal skin sensation and reflexes were preserved while the pain and hyperalgesia disappeared. Following the injections, the needles were left in place for twenty minutes, then 10 cc. of a 2 percent solution of procaine hydrochloride were injected. Within two to three minutes there occurred a rise in skin temperature of the extremities, numbness of the extremities and loss of the Achilles reflex, indicating that the needles were correctly placed. This observation is extremely important as indicative of the fact that the *ammonium ion has the ability to exert a selective action not possible with procaine.*

However, in the light of subsequent investigations involving a comparison of the action of the two solutions (ammonium sulfate and Pitcher Plant distillate) on nerve impulses as shown by the cathode ray oscillograph, it has been concluded that the activity of SARAPIN is due only in part to its content of ammonium ions. Studies on the isolated saphenous nerve of the cat have shown that complete obliteration of the C fiber potentials, accompanied by only slight reduction of the maximal A spike, is possible with Pitcher Plant distillate containing the equivalent of less than five-tenths of a milligram of ammonium sulfate per cubic centimeter; similar studies have shown that a concentration of ten milligrams (20 times as much) of pure ammonium sulfate per cubic centimeter was required to produce comparable effects and, at this concentration, the safety of use becomes questionable. For want of a better explanation it has been theorized that the Pitcher Plant distillate (SARAPIN) contains an infinitesimal and unidentifiable biological antagonist potentiating the action of the ammonium ion.

THERAPEUTIC INDICATIONS

The painful syndromes most commonly encountered in general practice which are relieved by SARAPIN treatment may be listed as follows:

Sciatic Pain	Brachial Plexus Neuralgia
Intercostal Neuralgia	Meralgia Paresthetica
Alchoholic Neuritis	Lumbar Neuralgia
Occipital Neuralgia	Trigeminal Neuralgia

These and allied conditions may be treated with success in a majority of cases by local infiltration or by nerve block. For such treatment, SARAPIN holds advantages over other forms of medication. Its selective action on the C fibers and its complete lack of effect on motor nerves make SARAPIN superior to such anesthetics as procaine which act merely by anesthetizing the entire nerve and surrounding tissue. Furthermore, there is *no tissue*

destruction as is the case when alcohol is used; there are no systemic reactions, and a lasting effect is obtained.

ETIOLOGY

Before any treatment is undertaken for the relief of these painful conditions, attempts should be made to determine the causative factors. Among the causes of parietal neuralgia, Bates[4] has found trauma, toxic foci (particularly in the nose and throat), postural defects, any combination of these three factors, endocrine imbalance, spinal arthritis, and metastatic malignant conditions of the spine. As in any curative problem, the first consideration is elimination of the cause. From their experience with over a thousand cases of backache in neuralgia clinics, Judovich and Bates state[5] that a predisposing factor such as lordosis, scoliosis, trauma or spinal arthritis exists in a majority of instances. It had been their experience that as little as three-eights of an inch difference in the length of the extremities is sufficient to produce a chronic tilt of the lumbar spine and a compensatory scoliosis. Frequently, corrective procedures are essential to satisfactory clinical response.

The same authors classify the etiologic factors concerned in low back pain according to the following scheme:

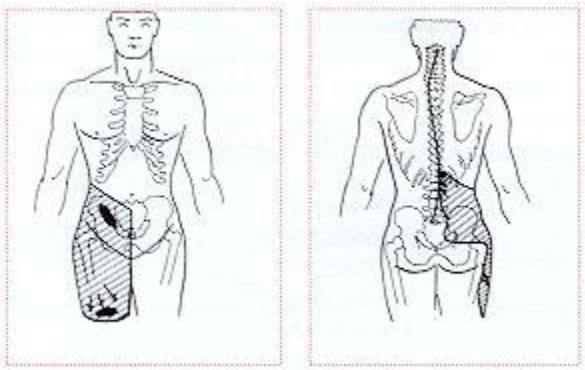
Group I -- Common	**Group II -- Less Common**
Infections	□ Malignancy
□ Mostly upper respiratory	□ Syphilis
(Pain one or two weeks later)	□ Diabetes
□ Focal	□ Herpes Zoster
Trauma	□ Pott's Disease
□ Direct	□ Spinal Cord Tumor
□ Indirect	□ Chemicals
Postural Defects	□ Blood Dyscrasias
□ Scoliosis	□ Local Lesions
□ Lordosis	□ Dermatitis
Spinal Arthritis	□ Abscess
	□ Cellulitis
	□ Myositis, etc.

CLINICAL OBSERVATIONS

Following extensive clinical experience with SARAPIN, Dr. Bernard D. Judovich issued the first report of his findings in an article entitled "For the Relief of Pain, a Preliminary Report on a New Therapy."[6] Largely through his efforts and those of Dr. William Bates, of Philadelphia, the

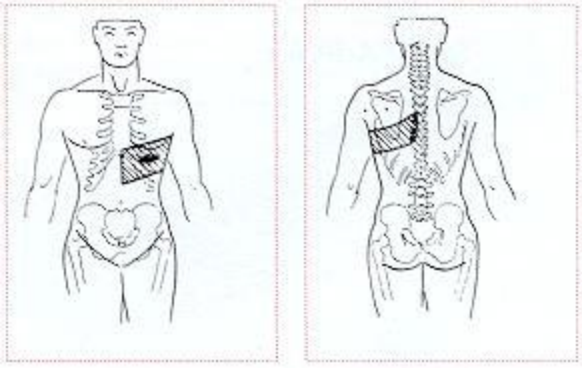
injection technique necessary for satisfactory results have become established. In a rapidly growing number of pain clinics, in industrial plants and in private practice as well, SARAPIN® is giving welcome relief to sufferers.

THE FOLLOWING CASES ARE TYPICAL:



Female. Age 32.

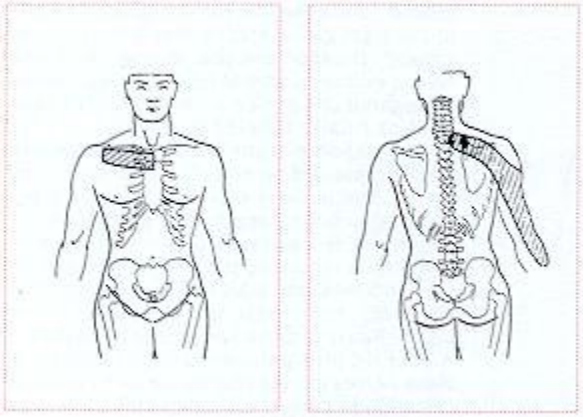
Complaint: Pain in the right lower quadrant and right thigh. Examination revealed a 3/8 inch shortening of the right leg with a scoliosis. The heel was raised. Following injection of only the 1st lumbar nerve there was marked improvement, and after 2 injections there was no further need for treatment.



Female. Age 28.

Complaint: Pain in left lower chest of 3 years duration. Increased pain with fatigue and "change of weather." Posture poor; lumbar lordosis with sway back. There was a segmental tenderness as indicated.

Infiltration of these areas plus postural correction resulted in complete recovery.

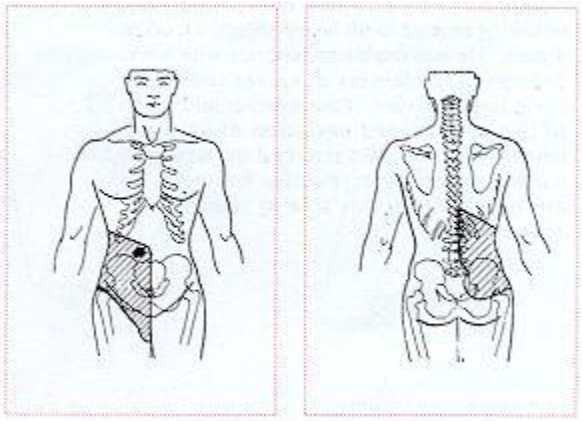


E.W. Female. Age 52.

Complaint: Very severe pain, right shoulder and back. Duration 6 weeks. Three months previous to the onset she was treated as a case of involutional melancholia. She received 8 electric shock treatments following which she developed very severe pain in the paravertebral region, right side, at the level of the 1st and 2nd dorsal roots. She was injected with procaine and obtained relief for 2 hours.

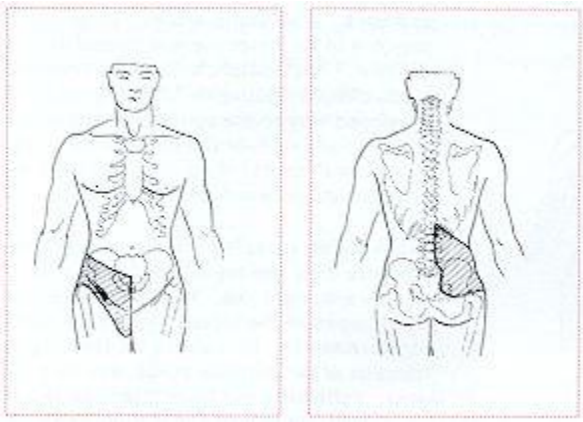
Examination revealed marked tenderness to pressure over the region of the 1st and 2nd dorsal roots, right side. Tenderness to pressure in the region of the triceps and a small band of tenderness in the subclavicular region. Injection of the involved trunks gave relief for 5 days. Following her third injection she was discharged free of pain and without tenderness. Three weeks later the patient reported that she was free of pain and tenderness.

E.H. Age 23.



Complaint: Pain in the abdomen, duration 3 weeks, not associated with any other symptoms. Examination: Routine studies negative. Increased lumbar lordosis with moderate sway back. Leg lengths equal. No rigidity of abdomen. There was a zone of segmental tenderness involving the nerve distribution indicated.

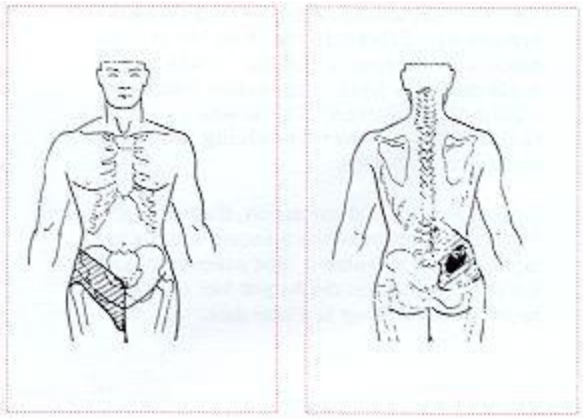
Treatment: Postural correction, diathermy and nerve infiltration of the affected areas gave rapid relief of symptoms. The patient received 4 injections and was discharged free of pain, to return for a follow-up at a later date.



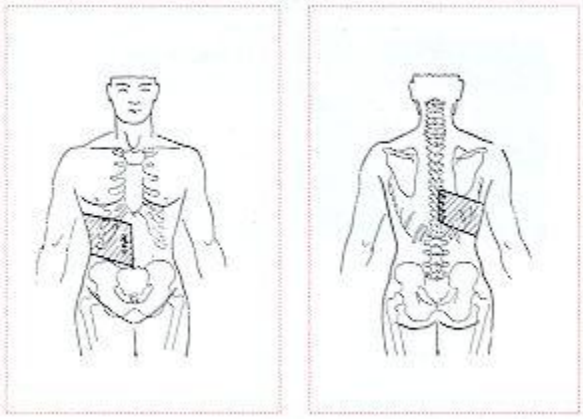
W.S. Male. Age 21.
Stevedore. Struck in low back and thrown to ground. Since then he has complained of pain in the right groin, stating that it hurt "in the crease." Duration one year, during which time he was examined several times. He was treated throughout this period without relief of pain. He was finally labeled a neurotic and his compensation discontinued. It was claimed that he

presented no objective evidence of any kind. The patient claimed that walking, bending or lifting aggravated his symptoms. Examination revealed a definite zone of tenderness involving the 12th dorsal and 1st lumbar nerves, and a ¾ inch shortening of the right leg. No muscle spasm. Inguinal ring intact. X-rays of dorso lumbar spine negative. A heel lift plus paravertebral infiltration of these nerves caused immediate and complete cessation of pain. In this particular case only two injections were necessary. They were followed by applications of diathermy to the dorso lumbar spine. Several months later there was no history of recurrence.

G.R. Male. Age 40.



Complaint: Pain in low back, right side, following attempts to lift heavy object. Duration 4 days. He was unable to continue with work. Segmental tenderness of nerves indicating dorso lumbar sprain. Paravertebral infiltration of this area caused cessation of pain and tenderness. The pain returned the next day, but was decreased in severity. Following his 4th treatment he was able to return to his duties.



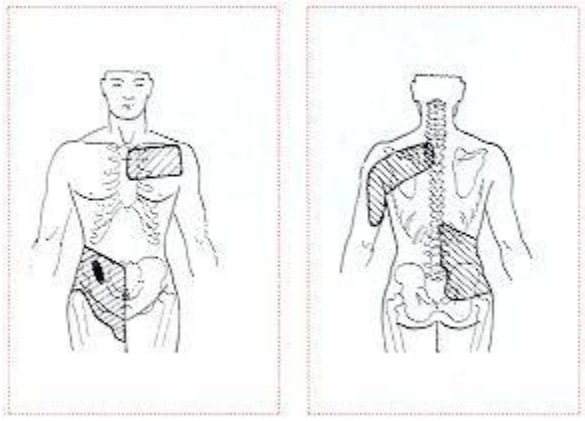
Complaint: Severe pain in abdomen of over two years duration. Cholecystectomy and laparotomy six months previous to examination appeared to have aggravated pain. Routine blood and urine studies revealed normal findings. X-ray of dorsal spine negative.

Examination revealed tenderness of the 7th, 8th, 9th and 10th right dorsal nerves; moderate spasm of the paraspinal muscles on the right side;

paravertebral trunk tenderness to pressure at points corresponding to the peripheral tender zone. The patient walked with spine slightly flexed, stating that this made the pain more bearable.

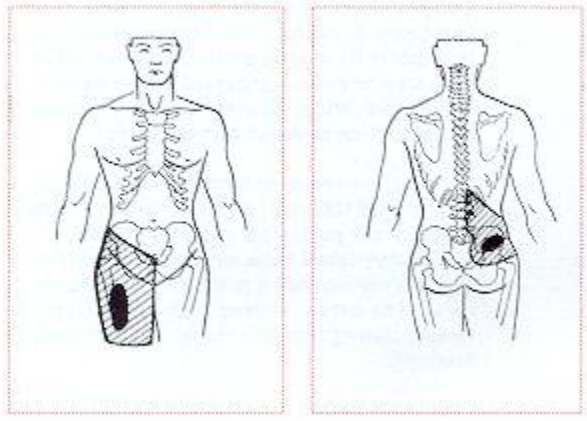
Treatment consisted of nerve block of the involved area and short wave diathermy. After 18 bi-weekly treatments she was completely free of pain. Two years later, there had been no recurrence and no tenderness could be found.

E.G. Female. Age 29.



Pain in the right lower quadrant of 11 years duration. Appendix had been removed without relief. Her continued complaints were explained as due to "adhesions," "inflamed ovary," and nervousness.
Examination revealed tenderness involving the right lower abdomen and left upper chest and a ¾ inch shortening of the left leg; segmental tenderness as indicated.
Infiltration of the nerve trunks supplying the right lower abdomen, accompanied by diathermy and a heel lift, terminated the pain.

L.S. Physician. Age 48.

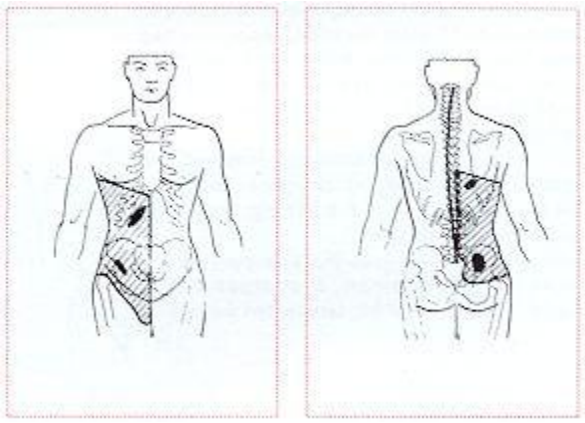


Severe low back pain with radiation to anterior thigh - duration 7 weeks. Previous treatment consisted of analgesics, physical therapy, and a sacroiliac belt. His pain was diagnosed as sacroiliac in origin. He was unable to wear the belt because of increased discomfort. The points of spontaneous pain involved the upper half of the buttock as far as the sacroiliac joint medially and the anterior thigh. These points were within a zone of tenderness which involved the 12th dorsal, 1st and

2nd lumbar dermatomes. There was trunk tenderness paravertebrally at points corresponding to the peripheral distribution.

Paravertebral infiltration at these levels caused immediate cessation of pain. There was no recurrence four years after the first injection. Etiology undetermined.

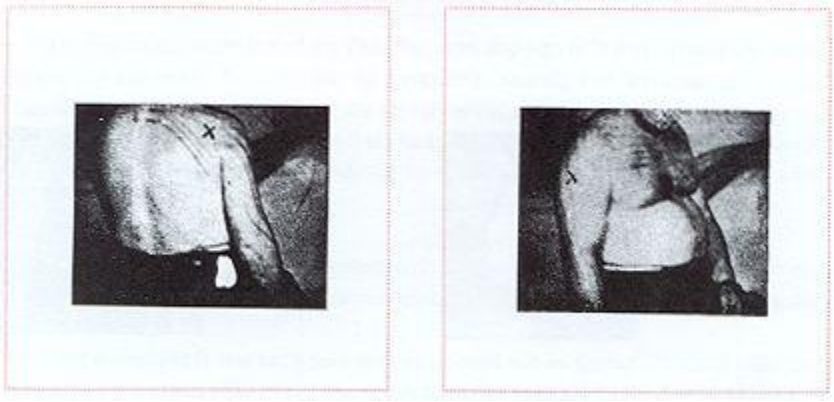
L.S. Male. Age 62.
Complaint: Pain in right abdomen and low back pain of 12 years duration. Appendix had been removed and treatment given for gastric ulcer and gall bladder disease without relief of pain. Routine studies were negative.



Examination revealed segmental tenderness of the right side; points of spontaneous pain over the gall bladder and appendiceal region and below angle of scapula. Pain also lateral to right sacroiliac joint. There was ½ inch shortening of the left leg.

Infiltration and diathermy caused complete cessation of pain and tenderness.

SHOULDER PAIN



Complaint: Acute pain in the right shoulder - duration 2 weeks. Painful on motion, unable to sleep. Followed a head cold. X marks points of complaint. Area of tenderness associated with these points have been "mapped out." Diagnosis: Neuralgia

of the 1st, 2nd and 3rd dorsal nerves. Prompt recovery followed injection therapy.

BACK SPRIAN

Traumatic backache, following heavy lifting. Duration 4 months. Forward and lateral bending painful. X-ray study negative. X marks point of patients complaint. Photograph illustrates area of associated tenderness, involving 11th and 12th dorsal and 1st lumbar nerves. No relief following medication and physiotherapy. Prompt relief on injection with no recurrence for three years. Previous diagnosis, sacroiliac sprain.

LOWER QUADRANT PAIN

Pain in the right lower quadrant. Duration 1 year. Possible appendicitis. Marked tenderness throughout distribution of 11th and 12th dorsal and 1st lumbar nerves. No nausea, no

vomiting, wide blood count normal. Injection of nerve roots gave lasting relief.

LOWER QUADRANT PAIN "SO-CALLED ADHESIONS"

Complaint: severe pain in right lower quadrant (X). Duration 9 years. Appendectomy followed by same painful symptoms. Later was told "adhesions" caused her pain. Outline surrounding painful areas shows associated tenderness involving 11th, 12th dorsal and 1st lumbar nerves. Nine treatments in a period of 3 weeks caused almost complete cessation of symptoms.

DIAGNOSIS

Pain of somatic origin may cause neuralgias of the shoulder, arms and legs or it may involve the nerves which supply the walls of the chest and abdomen. Evidence may be a segmental neuralgia or, less commonly, a peripheral neuralgia. Segmental neuralgia is a syndrome involving the spinal nerves and causing pain and tenderness of the body surface in the spine sendory segments. By virtue of their location and character, neuralgias of somatic origin may simulate the pain of visceral disease. Neuralgia involving the lower quadrants of the abdomen is a frequently occurring phenomenon.

Because of the very real danger of mistaken diagnosis with the possibility of a resultant useless operation, Bates has evolved and described[7] a thoroughly comprehensive diagnostic technique for examinations of the abdomen.

A frequently occurring complaint is low back pain and, as pointed out by Cyriax[8], "clearly ideal conditions for the erroneous perception of the site of a pain exist in the lower back; for here are found deeply situated muscles, fasciae, capsules and nerve-sheaths, placed at the upper ends of long segments." The importance of a differential diagnosis has been described by several authors. The appended references (9 to 16) will provide a key for further information.

ANATOMICAL CONSIDERATIONS

In the paragraphs which follow there is given a necessarily brief description of the basic technique involved in the control of parietal pain by means of injection. It is self-evident that a thorough working knowledge of anatomy is a pre-requisite for the successful application of this type of therapy. It is not the intention of this booklet to describe completely all those conditions for which SARAPIN® may be useful, but to indicate a few representative cases with an outline of the technique which has been shown to produce satisfactory results. Although local infiltration into peripheral areas may give relief from pain, it is more generally satisfactory to treat the source of the pain through the paravertebral route.

THE CERVICAL NERVES

The sensory nerves of the neck belong to the cervical plexus. Their course is converging, thus making possible a conductive anesthesia either at the posterior border of the sternocleidomastoid muscle or at the transverse process of the cervical vertebrae.

Technique of Injection
Three methods of approach to the cervical plexus have been described: the posterior, the lateral and the oblique. The posterior route is generally considered the safest and, although the nerve trunks cannot be directly contacted by the method, there is sufficient infiltration to produce effect. With the patient's head flexed and supported, locate the 7th cervical spinous process; this is the most prominent. As a check, the level of the transverse process of the 6th cervical vertebra may be determined by a line passing horizontally around the neck through the lower border of the cricoid cartilage. The level of any desired process can be determined by its relation to the two processes located as above.

Raise procaine wheals opposite the desired spinous process 2 cm. From the midline and pass a 3 inch, 21 gauge needle directly ventral in a direction parallel to the sagittal plane of the neck. On contact with the lamina, change the angle gradually so that the needle points laterally until it is felt to slip off the lateral aspect of the lamina. Pass the needle 1cm. further and inject the solution.

Excellent results are also frequently obtained by local infiltration into the tender points of the cervical region.

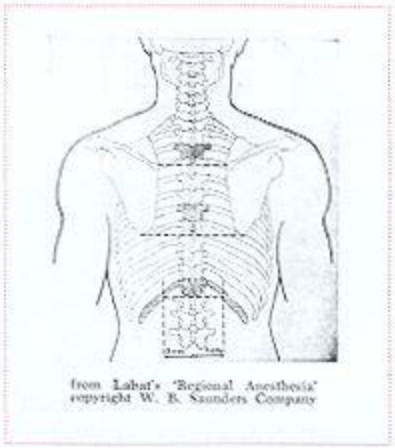


Figure 1

Landmarks of the dorsal vertebrae. With the arms alongside the body, the horizontal line passing through the spine of the scapulae marks the spinous process of the third dorsal vertebra; that drawn at the level of their inferior angle passes between the seventh and eighth dorsal spines. The perpendicular measuring 5 cm. dropped from the twelfth rib on the middle of the back, marks the spinous process of the twelfth dorsal vertebra.

THE INTERCOSTAL NERVES

The intercostals and the 1st lumbar nerves carry the sensory supply of the abdominal and chest walls, the parietal pleura and the parietal peritoneum.

Juat after leaving the intervertebral foramina of the dorsal vertebrae, the thoracic nerves send out communicating branches (rami communicantes) to the sympathetic nerves, then divide into anterior and posterior branches. The anterior branches, known as the intercostal nerves, run near the middle of the intercostals spaces at their origin and, toward the angle of the rib, approach the lower border of the rib above. In the beginning, the nerves lie upon the endothoracic fascia and pleura, then, as they come toward the angle of the rib, they lie between the internal and external intercostals muscles.

The posterior branch turns backward and also divides into two branches which supply the muscles and skin of the back.

Technique of Injection

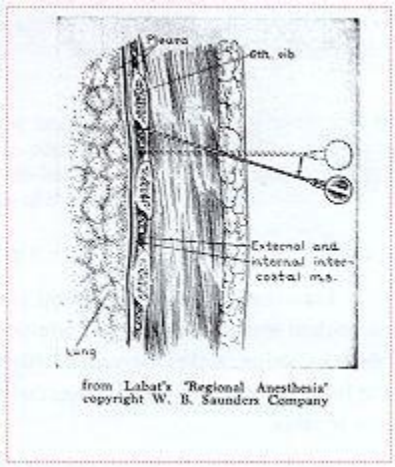


Figure 2

Paravertebral dorsal block. If the needle happens to pass between two ribs, it should be withdrawn and reintroduced in another direction, seeking contact with one of the ribs.

Anesthetize the skin 4 to 5 cm. lateral to the midline of the spine. Insert a 3 inch 21 gauge needle at right angles to the skin and advance until contact is made with the posterior portion of the rib above the nerve to be injected. Gently change the angle of the needle so that its point just clears the lower border of the rib as further insertion is made for a distance of 1 to 2 cm. Begin the injection as the needle leaves the lower border of the rib and is being pushed into the intercostals space.

It is not necessary to search for the nerves, as points of injection are determined by interpreting peripheral areas of pain and tenderness, paravertebral tenderness and the landmarks of the spine.

THE LUMBAR NERVES

The lumbar nerves lie between and anterior to the transverse processes of the lumbar vertebrae, anterior to the transversalis muscle which connects the transverse processes, surrounded by the origin of the psoas muscle. The branches of the 12th dorsal and 1st lumbar nerves, the ilio-inguinal and the ilio-hypogastric nerves are important nerves supplying the anterior abdominal wall. From the 2nd lumbar, the merging trunks take a directly downward course, lying very close to the vertebral bodies.

Technique of Injection

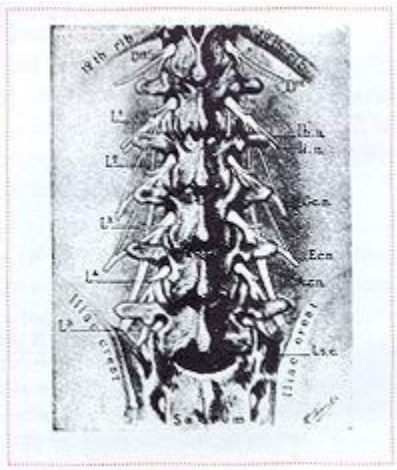


Figure 3

The lumbar nerves in relation to the spine; Ih.n., Iliohypogastric nerve; li.n., inguinal nerve; Gc.m., genitocrural nerve; E.c.n., external cutaneous nerve; A.c.n., anterior crural nerve; Ls.c., lumbosacral cord.

Examination of the peripheral areas of pain and tenderness and the location of paravertebral tenderness at points corresponding to the peripheral tenderness, as discovered by deep palpation, makes it possible to determine which nerve trunk is involved and assists in the localization of the area for injection. Recognition of the bony landmarks of the spine is also of value.

Using an injection of the 12th dorsal and the 1st lumbar nerves as an example, the following technique may be employed: Have the patient in a prone position with a pillow under the lower abdomen and the shoulder on the affected side raised in order to bring the spinous processes and last ribs into prominence as landmarks. Locate the spinous processes of the 1st and 2nd

lumbar vertebrae and draw a line at right angles to the upper edge of each spinous process. On each of these lines produce a procaine wheal 3.5 cm. laterally (See Fig. 4.)

Pass a 3 inch, 21 gauge needle directly downward for a distance of 4 to 6 cm. to impinge on the transverse process. If contact is not made within a reasonable depth, partially withdraw the needle and reinsert upward until the transverse process is located. After obtaining the depth, partially withdraw the needle and change the angle until further insertion just clears the transverse process and insert to a depth 3 cm. greater than that required to make the preliminary contact with the posterior aspect of the transverse process.

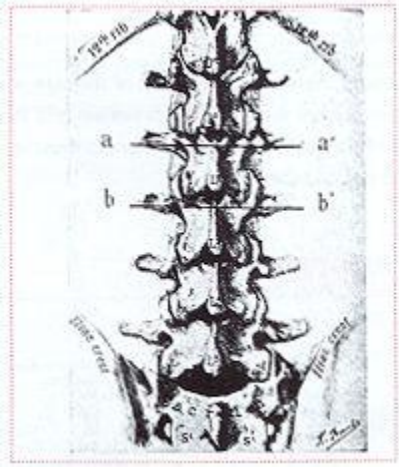


Figure 4

Back view of the lumbar spine. The horizontal lines a-a', b-b', drawn tangent to the edge of L2 and L3, mark the transverse processes of these vertebrae. The space betwwen two lines is second lumbar space, which is site of injection of the second lumbar nerve.

Aspirate to see that the needle is not in a blood vessel and inject 5 to 10 cc. Of SARAPIN® into the 12th dorsal nerve so reached. At no time should the needle point be directed toward the spine.

In order to reach the 1st lumbar nerve, the needle is inserted so as to contact the transverse process of the 2nd lumbar vertebra, then passed over the upper edge, employing the technique described above. The 2nd, 3rd and 4th lumbar nerves are reached similarly, in each instance the needle is slid over the upper edge of the next lower process.

The 5th lumbar nerve is reached by striking the 5th transverse process, then passing the needle point below.

Distance of points of injection from midline of spine:

12th dorsal…….. 3 cm.
1st lumbar……..3.5 cm.
2nd lumbar……..3.5 cm.
3rd lumbar……..3.5 cm.
4th lumbar……..3.5 cm.
5th lumbar……..3.5 cm.

THE SCIATIC NERVE

The sciatic nerve supplies most of the skin of the leg, the muscle of the back of the thigh and of the leg and foot. It is derived from the 4th and 5th lumbar and the 1st and 2nd sacral nerves, passes out of the pelvis through the greater sciatic foramen below the pyrifrormis muscle, and extends downward between the greater trochanter of the femur and the ischial tuberosity.

Technique of Injection

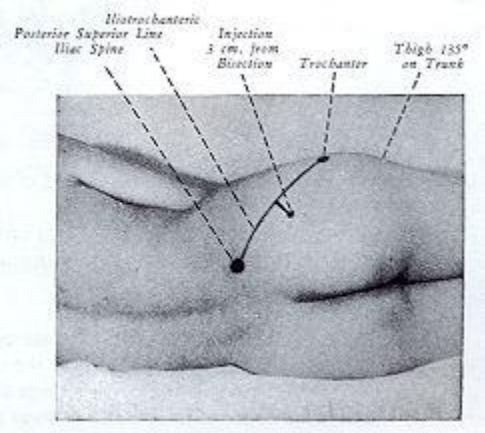


Figure 5
Greater sciatic nerve Injection

Have patient lie with the affected side uppermost, the thigh being flexed on the trunk at an angle of 135° so that the long axis of the femur points toward the posterior superior iliac spine. Locate the upper extremity of the great trochanter and the posterior superior iliac spine. Draw an ilio-trochanter line upon the skin and, at its midpoint, draw a perpendicular downward for a distance of 3 cm. (1.25 inches) to locate the point at which the needle is to be inserted. (See Fig. 5.) At the site, insert a 3 ½ inch, 20 gauge needle in a direction normal to the skin until contact is made with bone at a depth of 6 to 8 cm. (2.5 to 3.25 inches) depending on the weight of the patient. If the nerve is not contacted as evidenced by lack of paraesthesias, withdraw the needle and gently reintroduce slightly upward, then, if necessary, slightly downward, until the nerve is located. Inject 10 to 20 cc. of SARAPIN® depending on the severity of the case.

Injections may be repeated daily or every other day, according to the response , for a total of 8 to 10 injections.

THE SACRAL NERVES

The sacral nerves can be injected individually in a manner similar to that required for other nerves in the paravertebral region by passing the needle through the posterior sacral foramina or they can be infiltrated by way of the caudal canal in the form of an epidural injection.

Technique of Injection

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Fig. 6

The sacrum in relation to the neighboring bony structures:

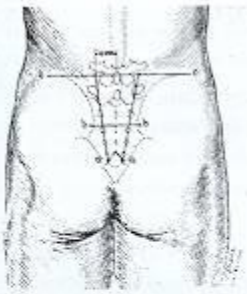

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Fig. 7

Transsacral block. Tracing of the lateral rows of sacral foramina on the skin surface: a, a, are the sacral cornua; b, b, the regional posterior iliac spine; c, c, the line tangent to the highest points of the iliac crests.

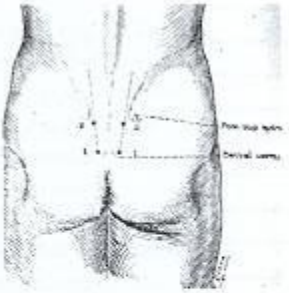

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Fig. 8

Transsacral block. The chief landmarks are the sacral cornua and the posterior superior iliac spine; 1 is a wheal raised just lateral to and above the sacral cornu; 2 is another wheal placed about 1 cm. medial to and below the said iliac spine. The straight line passing through 1 and 2 marks the direction of the sacral foramina.

After palpating the posterior superior spine, the most prominent point of the posterior extremity of the iliac crest, place a wheal 1 cm. below and 1 cm. medial to this point. This marks the location of the 2nd sacral foramen (See Fig. 8, Point 2.) Place another wheal just lateral to and above the sacral cornu. (See Fig.8, Point 1.) The line connecting these two points marks the direction of the sacral foramina.

Place two other wheals, dividing the distance between points 1 and 2 into three equal parts, thus defining the location of the 2nd, 3rd, 4th and 5th sacral foramina. The 1st foramen is found by raising a wheal 2.5 to 3 cm. above that which marks the location of the 2nd sacral foramen.

Pass a 3 inch, 21 gauge needle through the wheal and gently pass to the posterior aspect of the sacrum, in a direction slightly inward and downward, until its point contacts bone in the region of the foramen. After losing contact with the posterior aspect of the sacrum, pass the needle into the foramen.

The depth to which the needle passes after entering the foramen varies according to the foramen being injected, due to the variation in thickness of the sacrum. The following are the depths to which the needle passes after entering the sacral foramina:

1st sacral……1.75 cm.
2nd sacral……..1.3 cm
3rd sacral……0.8 cm.
4ht sacral……..0.4 cm.

When the proper depth has been reached, injection may be completed.

CAUDAL CANAL

Technique of Injection

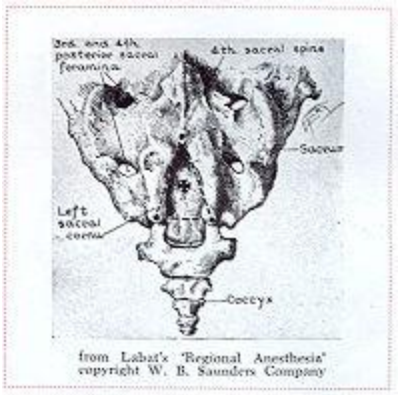


Figure 9

The site of puncture (cross) through the sacral hiatus is the center of the triangle formed by joining the sacral cornua and the fourth sacral spinous process.

With the patient in a prone position, palpate the 4th sacral spinous process and, using this as a guide, locate the two sacral cornua, one on each side, and slightly lower down. A continuous line connection the two sacral cornua and the 4th sacral spinous process forms a triangle in the center of which can be palpated a depression which marks the junction of the coccyx with the sacrum. (Fig. 9)

Insert a spinal puncture needle through a procaine wheal directly downward through the center of this depression in order to pierce the sacrococcygeal membrane and contact the anterior wall of the canal. Withdraw the needle 1 or 2 mm. and swing the hub downward toward the gluteal cleft, then advance until the point stands midway between the 2nd and 3rd sacral foramina. Make sure that spinal fluid cannot be obtained and proceed with the injection.

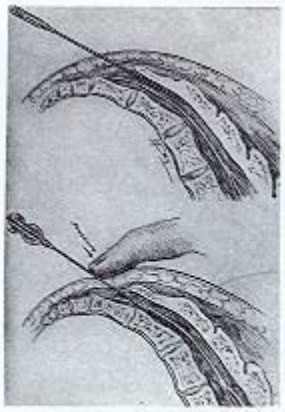


Fig. 10

Caudal block. Simple device for introducing the needle into the sacral canal. Pressure at the site of puncture is alternately applied and released so as to prevent the needle from striking either wall of the canal.

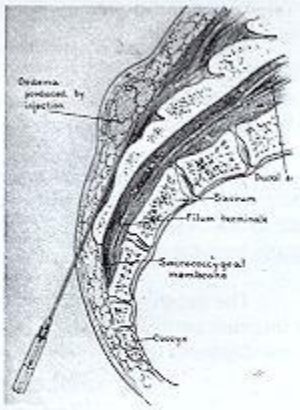


Fig. 11

Caudal block. The edema produced on the posterior aspect of the sacrum is the undeniable proof that the needle has not been introduced into the sacral canal.

LOCAL INFILTRATION

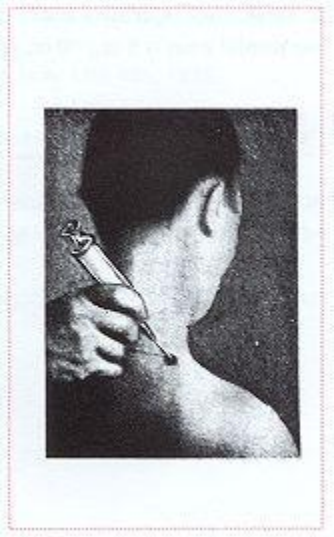
As pointed out elsewhere in the text, a paravertebral injection is the preferred method of administration of SARAPIN. However it is also possible to bring about relief from pain by means of local infiltration directly into the sensitive areas and there are times when it is advisable to employ this method of adminisration.

Technique of Injection

Draw an outline of the tender area, making sure by firm finger pressure that the entire area is included. Make four or five SARAPIN® injections of one or two cc. each with an inch and a half needle at different sites within this tender area. After twenty minutes to a half hour it may be noted that the tenderness is considerably lessened. Within a few hours the pain is completely gone. Occasionally this treatment may have to be repeated in a few days to insure permanent results.

One of the principal factors to keep in mind with the use of SARAPIN® is its complete safety. As pointed out previously, SARAPIN® has been proved absolutely non-toxic and to possess no discernable systemic reaction. There are no contra-indications --- with the obvious exception of local inflammation. Although this method of local infiltration frequently gives excellent results, the percentage of failures may prove large due to the fact that injections are made into the area of tenderness when the actual source of irritation may be the paravertebral region of the spine. Consequently, if desired relief is not obtained by means of a series of local injections, the blame should not be placed on the product, nor is the technique necessarily at fault.

MYALGIAS



In the various types of myalgia, injections can be made intramuscularly into the most sensitive areas.

GENERAL SUGGESTIONS

1. A brief review of anatomy will facilitate nerve root injections.
2. Procedure should be gentle and unhurried.
3. Withdraw plunger of syringe to make sure the needle point is not in a blood vessel.
4. Retain patient in a recumbent position for 10 to 15 minutes following injection.
5. Patients should be told they will develop a local sensation following injection, limited to the

distribution of the nerve injected. This is purely a temporary sensory phenomenon and is usually a feeling of heaviness, although a small percentage of cases will feel heat or a temporary aggravation of symptoms.

RECOMMENDED READING:

The Trigger Point Manual
By Janet G. Travell, M.D.
David G. Simons, M.D.

Injection Techniques: Principal and Practice
Physical Medicine and Rehabilitation Clinics of North America - November 1995

DOSAGE

The amount of SARAPIN® to be injected depends on the size and location of the area being treated. For paravertebral nerve injection, the following doses are used for the specific areas:

Cervical……2-3 cc.
Dorsal…….5-10 cc.
Lumbar……5-10 cc.
Sacral……3-5 cc.

In sciatic nerve trunk injections and in caudal canal injections, 10 cc. may be used. An average dose for local injection into painful areas is 5 cc.; 10 cc. may be required for large areas.

HOW SUPPLIED

SARAPIN® is supplied in 50 cc. multi-dose vials.

BIBLIOGRAPHY

1. Intractable Pain. Bates, William, and Judovich, Bernard D., Anesthesiology, 3:663, 1942.

2. Control of Somatic Pain. Bates, William, Am. J. Surg., 59:83, 1943.

3. Ammonium Chloride in the Relief of Pain. Steward, W., Hughes, J., and Judovich, B. D., Am. J. Physiol., 129: 474, 1940.

4. differentiation between Parietal and Visceral Pain in Surgical Diagnosis. Bates, William, J. Int. Coll. Surg., 2: 159, 1939.

5. Low Back Pain. Judovich, Bernard D., and Bates, William, Industrial Medicine, 8: 160, 1939.

6. For the Relief of Pain, a Preliminary Report on a New Therapy. Judovich, B. D., Med. Record, 141: 583, 1935.

7. Parietal Neuralgia. Bates, W., Ohio State Med. J., 34: 283, 1938.

8. The Diagnosis of Backache. Cyriax, James, Med. Press and Circ., 207: 406, 1942.

9. Observation on the Mechanism of Abdominal Pain. Mayo, Charles H., Brit. Med. J., 2:703, 1929.

10. Diagnostic, Prognostic and Therapeutic Nerve Blocks. Ruth, Henry S., J.A.M.A., 102: 419, 1934.

11. Segmental Neuralgia in childhood Simulating Visceral Disease. Davis, John Hart, J.A.M.A., 107: 1620, 1936.

12. Referred pain Arising from Muscle. Kellgren, J. H., Brit. Med. J., Feb. 12, 1938, p. 321.

13. Differential Diagnosis of Pain Low in the Back. Steindler, A., J.A.M.A. 110: 106, 1938.

14. Differential Diagnosis and Treatment of Sciatica: The Non-Diskogenic Causes. Namey, T.C., Advanced Clinical Updates, Vol. 1, No. 5, November, 1985.

15. Sorting Out the Causes of Sciatica. Namey, T.P. and An, H.S., Modern Medicine, October, 1984.

16. The Omohyoideus Myofascial Pain Syndrome. Rask, M.R., Journal of Cranio-Mandibular Practice, Vol. 2, No. 3, June-August, 1984.