

THE RELIEF OF PAIN BY A COLD-SPRAY TECHNIQUE

A. E. FLAX, M.B., CH.B. (CAPE TOWN), F.R.C.S. (EDIN.); M. HELMAN, M.B., CH.B. (CAPE TOWN); R. D. HEALD, M.B., CH.B. (CAPE TOWN); and A. W. SPRATT, M.B., CH.B. (CAPE TOWN)

General Practitioners, Cape Town

Counter-irritation to pain by such methods as pricking, heating, chilling, vibration and chemical irritation of the dermatome involved, has been used since the time of Hippocrates.

Chilling by cold spray in the form of ethyl chloride was first used by Janet Travell¹ in 1952 for the relief of wry neck, and Ellis reported his experiences with this method in 1956. Again in 1961 Ellis² published an article in the *British Medical Journal* describing his results in the casualty department of the General Infirmary at Leeds.

Our trial was conducted by 20 general practitioners in Cape Town using a fluoromethane mixture — 'skefron'. The advantages of this preparation over ethyl chloride are its non-inflammability and lack of general anaesthetic properties, and the ease with which it can be transported in aerosol-type metal containers. The trial was conducted on 137 patients chosen at random. The results were reported on a standard tabulated form by each practitioner.

RATIONALE OF TREATMENT

McKenzie postulated that an irritable focus develops in the gray matter of the posterior horn of the spinal cord as a result of an abnormal stream of impulses from a diseased organ. Irritation of the appropriate area of skin in this reflex arc is exaggerated by the irritable focus in the posterior horn. Afferent stimuli, produced by skefron, have the effect of filling this reflex arc to the exclusion of stimuli from the diseased organ. The motor stimuli which produce muscle spasm over the affected tissue should, in theory, also be abolished (Fig. 1).

Travell¹ and Ellis,² on the other hand, maintained that the 'central receptors', presumably in the thalamus, are bombarded with such a barrage of cold impulses that the pain stimuli are swamped.

Pain stimuli can be blocked either at the periphery

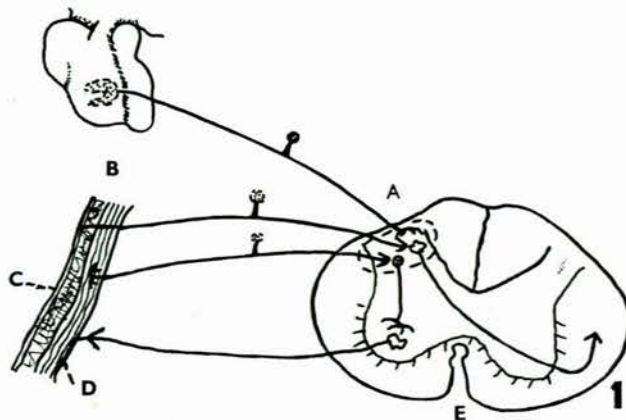


Fig. 1. Possible neural basis of referred pain. (From Samson Wright: *Applied Physiology*.) A=McKenzie's irritable focus. B=body wall. C=skin. D=muscle. E=upper thoracic cord.

of the end receptors of the affected dermatome, or at McKenzie's 'irritable focus' in the cord, or in the central receptors, presumably in the thalamus, as postulated by Ellis and Travell.

If any of these theories are tenable it is fair to postulate that where the pain stimulus is of greater intensity than the stimulus or summation of stimuli from the counter-irritant, then the results will be less satisfactory in direct proportion.

METHOD OF TREATMENT

A single treatment consisted of 3 applications each lasting 5 seconds and separated by an interval of $\frac{1}{2}$ - 1 minute, the jet being directed at right angles to the skin surface and care being taken to avoid freezing the skin. This was considered important because, if the skin is frozen,

cold impulses will no longer be generated; however, the pain produced in the thawing process may also be a form of counter-irritation and account for the successes achieved by freezing.²

Not more than 3 treatments were given in any one day, and patients were asked to record the onset, degree and duration of relief after each treatment.

ANALYSIS OF RESULTS

Criteria for Classification of Cases

The results in each patient were tabulated as *excellent*, *good*, *moderate to fair*, and *poor*; and patients fell into these groups on the following criteria: the rapidity, the amount, and the duration of relief following each treatment.

The term 'satisfactory' refers to patients in whom 'good' to 'excellent' results were obtained.

Classification into groups I to VI is an attempt to group together those conditions of similar anatomical and pathological nature giving a similar type of pain (Table I).

TABLE I. TABULATION OF RESULTS

	Excellent	Good	Moderate	Poor	Total
Group I					
Wry neck	33	1	14	10	58
Fibrositis					
Osteoarthritis					
Myositis					
Group II					
Muscle strain	4	3	5	4	16
Trauma of muscles					
Group III					
Lumbar discs	6	2	5	6	19
Sacroiliac strain					
Group IV					
Shoulder syndrome	2	2	2	2	8
Group V					
Post-tussal pain	6	1	5	4	16
Fractured ribs					
Pleurodynia					
Group VI					
Angina pectoris	5	7	2	6	20
Dysmenorrhoea					
Headache					
Renal colic					
Arthritis (rheumatic)					
Herpes zoster					
Intermittent claudication					
Gout					
Pneumothorax, spontaneous					

TABLE II. ANALYSIS OF GROUP VI

	Excellent	Good	Moderate	Poor	Total
Angina pectoris	—	—	—	1	1
Dysmenorrhoea	1	—	—	1	2
Headache	1	—	1	—	2
Renal colic	2	1	—	1	4
Rheumatic arthritis	—	2	—	—	2
Herpes zoster	1	2	1	1	5
Intermittent claudication	—	—	—	1	1
Gout	—	2	—	—	2
Pneumothorax, spontaneous	—	—	—	1	1

DISCUSSION

The fact that the practitioners concerned in the collection of these case records have had the opportunity of knowing the majority of patients over some period of time makes the assessment of the results of greater validity than in an outpatient survey.

In the largest series of similar conditions, i.e. group I, 59% of the results were satisfactory. The characteristic symptom of this group is pain from muscle spasm. This is in keeping with the results of Ellis² and Traherne,³ although they claim a higher percentage of success.

In groups II, III, IV and V satisfactory results were obtained in 44, 42, 50 and 44% of cases respectively.

The underlying pathology in itself gives pain in addition to some muscle spasm, and the less satisfactory results could be explained by the theory that the pain stimulus was of greater intensity than the stimulus from counter-irritation. This suggests that treatment will be more effective where muscle spasm is the predominant cause of pain.

The 'intensity of pain' theory is particularly borne out by the results in group V, where pain is of a sharp and stabbing nature and usually distressing to the patient.

In group VI, which is further analysed in Table II, the best results were obtained in renal colic and herpes zoster. In the former, pain is due to spasm of smooth muscle.

Ellis claimed immediate relief in renal colic in his experience in the casualty department at Leeds General Infirmary where some 40 patients were seen per year.

Taverner,⁴ of Leeds University, claimed satisfactory relief of post-herpetic neuralgia in 12 out of 16 patients.

We feel that skefron is a safe, simple and effective aid in our armamentarium against pain. Furthermore,

it gives quicker and more effective relief for the appropriate type of pain than most remedies at the patient's disposal. Skefron lends itself to easy conveyance and availability.

In this series no side-effects or skin damage were reported except in a case of urticaria where vesicles of considerable dimensions were rapidly produced.

SUMMARY

A trial on 137 patients was conducted in Cape Town by 20 general practitioners on the symptomatic treatment of pain with a cold-spray counter-irritant.

The main indication for this method of treatment is pain associated with muscle spasm.

The remarkable simplicity and safety of this form of pain treatment is apparent.

We thank the members of the Cape of Good Hope Faculty of the College of General Practitioners for their help in collecting material. The work reported here was carried out under the auspices of the College.

We also thank Messrs. Smith, Kline and French Laboratories for the generous supply of skefron, and in particular Dr. I. Schrire, their director of medical services, for his guidance and for furnishing references.

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