

THE USE OF PROTEOLYTIC ENZYMES (CHYMORAL) IN SPORTING INJURIES*

W. F. (ROB) RATHGEBER, M.B., B.Ch. (RAND), Durban

exact mode of action of proteolytic enzymes in the resolution of accidental or postoperative oedema is not known. Many workers have suggested that these drugs break down fibrous material, blocking the lymphatics and capillaries, thereby restoring microcirculation. The theory, however, still remains to be proved as are also the exact enzymes leading to the build-up of inflammatory oedema.

Enzymes are important complex compounds which have various pharmacological effects both in the general processes of digestion and at tissue level. Ambrus *et al.*¹ have shown that chymotrypsin and trypsin can be absorbed across the abdominal wall. This itself appeared to be a factor which was initially queried by many members of the medical and scientific professions. They went on to say that the theory that proteolytic enzymes could not be absorbed because of their molecular size could be discounted as molecules of 10 times their size could be shown to be absorbed. Ambrus *et al.* showed that when enzymes were taken with food a considerable amount of their activity was lost in the normal digestive processes. It is therefore essential that the proteolytic enzymes should be taken when the stomach is empty, preferably $\frac{1}{2}$ - 1 hour before meals.

Lie *et al.*² were able to use objective parameters in measuring the value of the proteolytic enzymes in post-traumatic trauma of the hand. The circumferential measurements of the fingers and palms were taken pre- and post-operatively and a comparison was made between patients using either Chymoral or a placebo. The results obtained showed a statistically significant improvement in the patients taking the active drug, reducing the time for resolution of inflammatory oedema by 50%.

Lonstein³ was able to show considerable improvement in boxers who used proteolytic enzymes both prophylactically and therapeutically. In this trial the double-blind technique was used and the patients taking the active drug showed an excellent response in respect of the time of recovery. Similar results were obtained by Boyne and Thurston⁴ when using proteolytic enzymes in accidental trauma associated with footballers and comparing the results of two seasons' injuries. Shaw⁵ and Lie *et al.*² have underlined the importance of reducing inflammatory oedema. They state that this often becomes fibrinous and eventually reduce the mobility of the limb or terminate the extremity. Pain and discomfort are prolonged and traumatic oedema often indirectly gives rise to scarring.

The essential point to bear in mind in relating the results of these trials to trauma associated with sporting injuries, is that if key personnel are away from their work for considerable periods of time their morale is reduced and their fitness is lost due to long periods away from participation in games or training. It is also difficult to encourage continued fitness despite rehabilitation programmes, if a player is injured. If, therefore, time lost due to accidental trauma can be reduced and the players returned to full function, considerable economies can be effected in the general running of sporting organizations.

It is also important from the players' point of view, particularly if they are professionals, as not only do they suffer pain and discomfort associated with accidental trauma, but they may also suffer financial loss in their inability to participate.

The resolution of inflammatory oedema, bruising and swelling is difficult to assess objectively. Over a period of years familiarity with the normal recovery processes can be estimated objectively if the doctor concerned regularly attends to these types of injuries. This is particularly so if patients are suffering from trauma associated with areas of the body that cannot easily be measured, such as the head and chest.

It was therefore decided to complete work on a varied selection of cases suffering from soft-tissue damage as a result of sporting injuries, using either Chymoral or placebo in a double-blind trial. The patients were often seen at the sporting events where they sustained the injury and the doctor was responsible for supervising the requirements of personnel in the field, or occasionally in casualty departments of local hospitals. The object of the trial was to return the patient to play as quickly as possible by the resolution of traumatic oedema which would consequently hasten healing time.

MATERIALS AND METHODS

The patients incorporated in the trial were those suffering from sporting injuries. These were sustained in various types of activities, including football, rugby, tennis, cricket, squash racquets and athletics. The types of injuries were soft-tissue damage to virtually every part of the body, including the hands, feet, head, chest, knees and ankles, as indicated in Table I. In some cases stitching and pressure strapping were required, and in all cases routine emergency treatment was employed.

TABLE I. SITES OF INJURIES

Injury	Chymoral	Placebo
Lower leg and ankle	6	5
Toe	2	1
Fingers	5	4
Jaw	2	1
Wrist	2	
Elbow	1	
Eye	1	1
Thigh	1	4
Head	3	
Groin		1
Face		1
Chest		1
Knee		1
Total	23	20

On entry into the trial full details of the nature and site of injury were entered on the patient's record card, together with emergency treatment given. Each record card was given a consecutive code number which corresponded with a container of tablets, and the patient was instructed to take 2 tablets 4 times a day, half an hour before meals. The tablets were either Chymoral or a

E III. NUMBER OF CASES FIT TO PLAY AND % FIT TO PLAY ON DAYS THROUGHOUT TRIAL

<i>s receiving Chymoral</i>		<i>Cases receiving placebo</i>		
<i>No. fit to play</i>	<i>% fit to play</i>	<i>Day</i>	<i>No. fit to play</i>	<i>% fit to play</i>
3	13	1	4	20
4	18	6	5	25
7	30	7	6	30
8	35	8	7	35
13	57	9	8	40
16	70	10	10	50
18	79	11	11	55
20	88	14	12	60
21	92	15	13	65
22	96	16	15	75
23	100	25	16	80
		28	17	85
		Over		
		30	20	100

and in each case the probability was less than 0.02. Although there was a considerable reduction in swelling the sixth day in 53% of the patients receiving the ve drug as compared with 29% of the patients reing the placebo on the same day, this was not stally significant (Table II).

throughout the trial it is interesting to note the number cases that were either resolved or recovered before 12th day in the patients receiving Chymoral as comed with those receiving the placebo. It is normally cipated in these types of injuries, serious enough to d medical attention, that the approximate time of reery, and therefore fitness to play, can be as long as 21 days. In the trial, and with the use of Chymoral, period was considerably reduced. Accumulated cases

in the various parameters showed that only 8 cases had not been resolved in 12 days, using Chymoral, whereas there were 36 recordings of cases using the placebo.

Table III and Fig. 1 show the number of patients and the percentage of patients who had recovered sufficiently to play, on the days throughout the trial, and clearly illustrate the difference in effectiveness of the two drugs, Chymoral and placebo. The average time for recovery of patients receiving Chymoral was 8½ days and for patients receiving placebo 17 days.

SUMMARY

A double-blind trial with either Chymoral or a placebo, on patients sustaining injuries due to accidental trauma in sport, was completed on 43 cases.

Statistically significant results were achieved in 3 of the 4 parameters used, namely bruising, return to function, and fitness to resume play. Although there was a considerable reduction in the resolution of swelling in patients taking Chymoral as compared with the placebo, this result was not statistically significant. The assessment of the resolution of inflammatory oedema in large limbs, chest and head is sometimes difficult, and this is probably the reason why a significant result was not achieved in this parameter. The speed of the recovery of patients treated with Chymoral is extremely valuable in maintaining the important morale, personal fitness and skill of the individual players.

It must be remembered that the patients treated were those who were fit and active, where the normal recovery rate is expected to be good. If it is possible, therefore, to improve the normal recovery rate this is not only economically valuable, but worthy of note from the clinical point of view.

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