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SECONDARY DISPLACEMENT OF REDUCED DISTAL RADIUS FRACTURES

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The correct treatment of a distal fracture of the radius is still a subject of divergent views in the literature. Correct anatomical healing, however, is generally regarded as desirable. This presupposes good reduction, fixation and effective control of possible redislocation, in order to be able to correct it when necessary. Apart from a few works, the literature does not offer details about the exact time of secondary displacement of reduced distal radius fractures. We consider this time factor is important in order to determine when and how often X-ray examinations should take place. In this way we can avoid unnecessary checking of the patients and also reduce the costs of treatment. In order to determine the frequency and exact time of secondary displacement after the reduction of the distal fracture of the radius, we examined prospectively one hundred cases with planned frequency and interval of X-ray checks.

MATERIAL AND METHODS

All fractures of the distal radius treated at the Department of Surgery I of Södersjukhuset, Stockholm between 1st November 1971 and 29th February 1972 were registered and checked by X-ray examinations 5–7, 10–15, 15–20 and 36–40 days after the incidence of the fracture. This relatively large spread was unfortunately unavoidable as the X-ray Department serves only emergency cases on Saturdays and Sundays. After having excluded cases where primary reduction was not indicated and fractures which were incompletely controlled, there remained 100 cases.

Of the 100 cases 85 were women and 15 were men; 67 of the women and 11 of the men were over 50 years of age. At the first evaluation of the degree of displacement, consideration was taken of both dorso-volar and radio-ulnar angulation and of possible dislocation *ad axin* as well. In the following presentation however, we have preferred to illustrate only the dorso-volar angulation in order to obtain better surveyability.

Table 1. Material: 100 reduced fractures.

Age	♂	♀
20	...	...
21–35	2	5
36–50	2	13
51–65	7	44
> 66	4	23
Total	15	85

Table 2. Classification of fractures of the distal radius according to Frykman (1967).

1. Extra-articular fractures without fracture of the distal ulna
2. Extra-articular fractures accompanied by fracture of the distal ulna
3. Intra-articular fractures involving the radio-carpal joint but without fracture of the distal ulna
4. Intra-articular fractures involving the radio-carpal joint and accompanied by fracture of the distal ulna
5. Intra-articular fractures involving the distal radio-ulnar joint but without fracture of the distal ulna
6. Intra-articular fractures involving the distal radio-ulnar joint and accompanied by fracture of the distal ulna
7. Intra-articular fractures involving both the radio-carpal and the distal radio-ulnar joint but without fracture of the distal ulna
8. Intra-articular fractures involving both the radio-carpal and the distal radio-ulnar joint and accompanied by fracture of the distal ulna

Table 3. Material: Types of fractures according to Frykman.

Type of fracture	Number
1	8
2	18
3	2
4	4
5	15
6	42
7	3
8	8
Total	100

Types of fracture

We adapted Frykman's (1967) system with eight groups of fractures.

The different types of fractures in the present material are shown in Table 3 which indicates that in more than 40 per cent of the cases both the radio-ulnar joint and the styloid process of the ulna were involved at the same time.

Immediate closed reduction was performed in all cases, most frequently under general anaesthesia. The primary immobilization consisted of a dorsal plaster

splint which, in two thirds of the cases, was completed by a circular plaster on the forearm applied 7 or 14 days after the injury.

RESULTS

In the following figures we only present secondary dislocations exceeding 10° dorso-volar angulation. As an illustration of the dynamics of the secondary dislocation, however, it is interesting to note that in 40 of the 100 cases we found secondary dorso-volar angulation less than 10°.

Of 100 cases we found 20 with secondary dislocation measured by a dorso-volar angulation exceeding 10°.

Figure 1 illustrates the incidence of fresh redislocations at each check i.e. *the number of first-discovered redislocations.* The incidence is about the same after 5–7 or 10–15 days and there is only one fresh redislocation at the third check.

Figure 2 illustrates the cumulative number of redislocations found during the checks. The degree of dislocation is compared with the position of the fracture obtained after reduction and the diagrams comprise *both* first-discovered redislocations *and* further redislocations since the previous check. This figure shows the importance of repeated

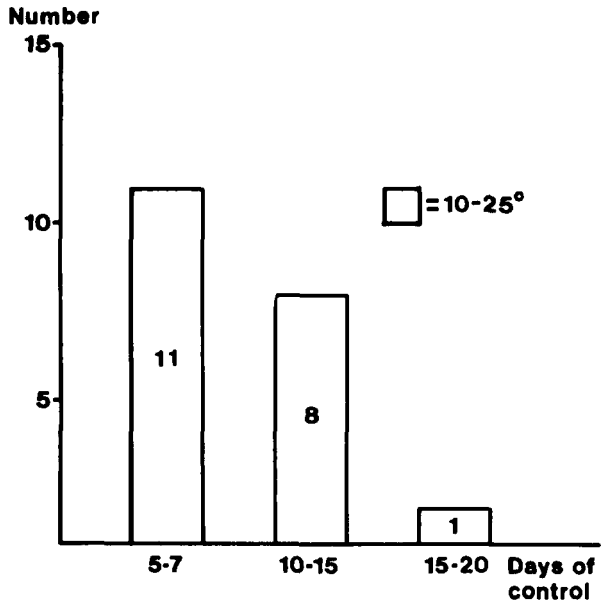

Figure 1. The number of first discovered redislocations.

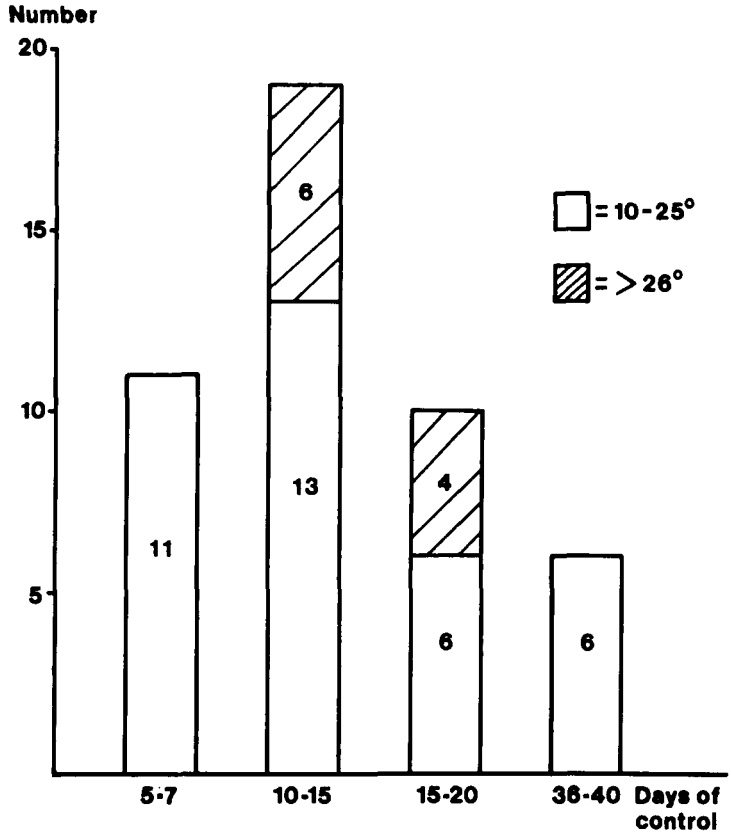

Figure 2. Cumulative number of redislocations.

checks and indicates the continuous process of tilting of the distal fragment. We find a peak at the second check (10–15 days after the injury).

Figure 3 shows the continuous process of secondary dislocations, comparing the angulation with the position of fracture at the previous check i.e. the diagrams illustrate the occurrence of redislocations *between* two checks. As in Figure 2 we find that the most important period of observation seems to be between the first and second check i.e. 5–14 days after the reduction of the fracture.

We have also examined the relationship between the result of primary reduction and the later secondary dislocation. We can not find evidence for lower frequency of secondary dislocations obtained by exact anatomical reduction.

The technique of immobilization – dorsal plaster splint or alter-

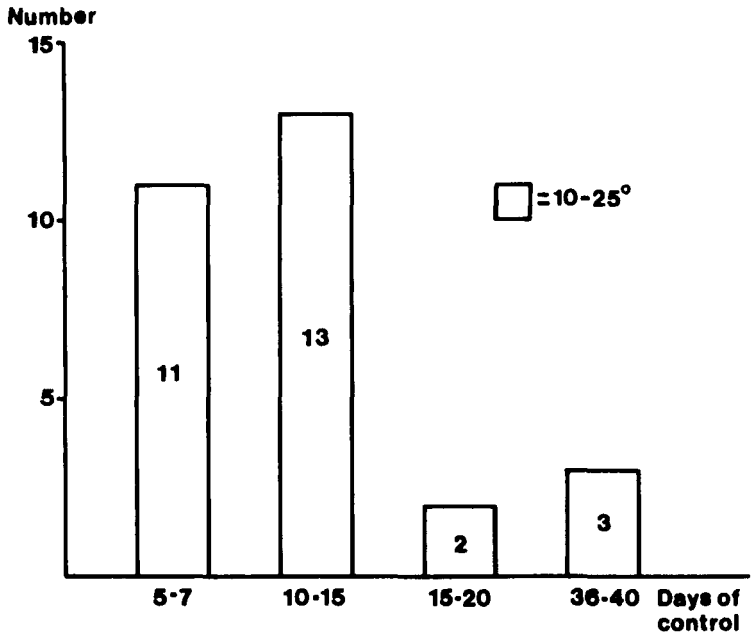

Figure 3. The frequency of the continuous redislocation.

natively circular plaster – does not seem to influence the frequency of secondary dislocation.

DISCUSSION AND CONCLUSIONS

The importance of the problems connected with fracture of the distal radius has given rise to two theses within the last decade in Sweden (A. Lidström 1959, G. Frykman 1967). Lidström (1959) tackles the problem of redislocation but without mentioning when it occurs. Madsen (1949)—who included 24 cases with dorso-volar angulation less than 10°—found an approximately equal number of redislocations during the first 3 weeks after the injury. Lidström (1959) quotes both Cornell and Sirbu & Collof who maintained that the second week and the first 10 days after reduction, respectively, were the critical periods for redislocation. We have found that most secondary displacements occur less than 15 days after the reduction of the first fracture. Consequently this gives an indication of the time of the first X-ray check which could take place 10–14 days after primary reduction. The following X-ray checks should be determined individually depending on the

type of fracture and the development of any redislocation with constant awareness of the possibility of late debut of redislocation.

We want to mention as an accessory finding of this investigation the occurrence of 6 patients with fracture of the distal radius where primary reduction was not considered as necessary. These fractures, however, underwent a continuous displacement which reached an unacceptable angulation in all 6 cases. In the literature we could not find any mention of the necessity of X-ray checks in fractures with such a low degree of angulation that reduction was not carried out.

SUMMARY

In a prospective investigation 100 fractures of the distal radius were the subject of repeated frequent X-ray examinations in order to determine the frequency and exact time of secondary displacement. Secondary displacement exceeding a dorso-volar angulation of 10° occurred in 20 per cent of the cases. Most of the displacements took place less than 15 days after the primary reduction. In spite of the relatively limited series the authors consider that a change in the routine of X-ray checks would result in more effective and less elaborate treatment of a very large group of patients and at the same time reduce the costs of treatment. The first X-ray check, therefore, could take place about 2 weeks after primary reduction of the fracture and the frequency and interval of following X-ray checks should be determined individually. Fractures with a primary displacement where reduction was not regarded as necessary, should be checked in the same way.

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