

## CHAPTER II

### REVIEW OF RELATED LITERATURES

Percutaneous pin fixation was first described for adult-t-condylar fractures of the humerus by Miller<sup>19</sup> in 1939. Swenson in 1948 reported using percutaneous method without mentioning the final result. In 1961, Casino showed that leaving the pins protruding produced no increase in the infection rate and facilitated their removal. Percutaneous pin fixation has rapidly gained popularity as manifested by many large series published in recent literature.<sup>2, 8,20,24,26,28</sup>

These recent reports have mentioned numerous variations in the technique of pin fixation. The original technique involved the use of two crossed pins, one inserted medially and one inserted laterally. A biomechanical study by Zions Le. and coworkers<sup>28</sup> found that – the medial-lateral pin configuration provided superior biomechanical stability. The incidence of ulnar nerve injury by medially configured pin has been mentioned to be 2%, but in many large reported series it was not existed. The incidence of pin tract infections is also quite low. The incidence of cubitus varus varied with the quality of reduction obtained. When careful efforts are made to first obtain an adequate reduction, the incidence of cubitus varus is 5% or less. The absolute indications for operative treatment are an open fracture and a severe vascular compromise, especially if it is aggravated by attempts for reduction. The presence of a neurologic deficit has not been believed to be an indication for surgical intervention.

Primary open reduction is not a new concept. In 1937, MacLennan believed that open reductions produced the best results. He used separate medial and lateral incisions with nail fixation of the fragment. In recent

reports, most authors recommend early open reduction if they fail to get an adequate reduction by closed method. The major complications of surgical treatment are reduction in range of motion and a cubitus varus deformity. Coventry<sup>6</sup> in the Mayo clinic series, had an average loss of flexion of 6.5 degree and extension of 5 degree. Carcassonne<sup>5</sup> believed that some reduction in range of motion was due to the use of a posterior surgical approach. Residual cubitus varus still was a significant problem in a number of reported operative series ranging as high as 33%. An inadequate reduction despite surgical management was given as the cause of the residual deformities.

Sutton,<sup>25</sup> (1992) reported a comparison of results and costs in patients treated by skeletal traction versus percutaneous pinning. The results of treatment were basically equivalent in the two groups and were satisfactory in 90% or more. Cost of treatment was lowest in those who had percutaneous pinning and subsequent pin removal in the office. Compared to this group, the cost of treatment increased by 23% in those who had percutaneous pinning and removal of the pins as a surgical procedure, by 117% in those treated by traction.

The good and excellent results for closed and open pinning could achieved more than 80 % success rates and higher than the other techniques.

Close reduction and percutaneous insertion of K-wires.

**Table 2.1 : Results of studies on percutaneous insertion of K-wires**

Author	Year	No of pts followed	Result		
			Excellent	Good	Unsatis
Flynn et al <sup>8</sup>	1974	52	42	7	3
Fowles and kasab <sup>9</sup>	1974	80	32	38	10
Arino et al <sup>2</sup>	1977	189	131	29	29
Prietto <sup>21</sup>	1979	19	14	2	3
Giannimi et al <sup>10</sup>	1983	50	35	15	0
Nacht et al <sup>20</sup>	1983	25	12	4	9
Walloe et al <sup>26</sup>	1985	19	0	13	6
Geraldi JA	1989	25	22	2	1
Paradis G	1993	26	26	0	0
<b>Total</b>		<b>485</b>	<b>314</b>	<b>110</b>	<b>61</b>
<b>Percentage</b>		<b>100</b>	<b>64.74</b>	<b>22.68</b>	<b>12.57</b>

**Open reduction and internal fixation with K-wires**

**Table 2.2 : Results of studies on open reduction and internal fixation with K-wire**

Author	Year	No of pts followed	Result		
			Excellent	Good	Unsatis
Holmberg <sup>13</sup>	1945	50	30	13	7
Gruber and Hudson <sup>11</sup>	1964	22	14	1	7
Alonso-Llamas <sup>1</sup>	1972	30	24	4	2
Carcassonne et al <sup>5</sup>	1972	40	22	17	1
Ramsey and Griz <sup>22</sup>	1973	15	12	3	0
Weiland et al <sup>27</sup>	1978	52	38	6	8
Krebs <sup>16</sup>	1980	23	16	7	0
Kotwal PP	1990	200	130	30	40
Furrer M	1991	30	27	3	0
<b>Total</b>		<b>462</b>	<b>313</b>	<b>84</b>	<b>65</b>
<b>Percentage</b>		<b>100</b>	<b>67.74</b>	<b>18.18</b>	<b>14.06</b>