Section: Orthopaedics

Original Research Article

A PROSPECTIVE COMPARATIVE STUDY TO ASSESS THE FUNCTIONAL AND RADIOLOGICAL OUTCOMES OF DIAPHYSEAL BOTH BONE FRACTURES OF THE FOREARM IN CHILDREN TREATED BY NON-OPERATIVE METHODS AND FOLLOWED UP USING TELEMEDICINE AND FACE TO FACE CONSULTATION

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ABSTRACT

Background: Aim: The objective of this study is to compare the functional and radiological outcomes of diaphyseal both bone fractures in children treated non-operatively and followed up using telemedicine and face to face consultation.
Materials and Methods: Children between 5 to 15 years with both bone forearm fractures attending our institution were taken for the study. The children were randomly allocated into 2 groups, those followed up with telemedicine and those followed up as face to face consultation .Closed reduction and a long arm slab was applied. Children in both groups were asked to attend the outpatient department after one week. Here the applied long arm slab is converted to a long arm cast and check X- ray images were taken. Those in the telemedicine consultation group were followed up in a local government hospital and advised to take a radiograph every two weeks till the sixth week. They have to take a photograph of the forearm in the cast and the radiograph and send it via Whatsapp. Those in the face to face consultation group were similarly followed up in the outpatient department. After 6 weeks the cast is removed and the children are sent to PMR department for mobilization. The children were followed up during the 2nd, 4th, and 6 months and at the end of the study for assessing clinical and radiological outcomes. **Results and Discussion:** A total of 219 patients (107 in the face to face and 112 in telemedicine groups) were included in the study. A fall was commonest cause of injury (82.2% and 86.6% in both groups). The distal third was the commonest site of injury (71% and 66.1%). Functional outcomes were measured in terms of elbow flexion and extension, pronation, supination, wrist flexion and extension, limb length discrepancy, grip strength and an outcome scoring. Radiological outcomes were measured in terms of displacement, angulation, malrotation, loss of radial bow and ulnar variance. There was no statistically significant difference between the 2 groups with p value > 0.05. The patient satisfaction was found to be higher in the telemedicine group (86%). **Conclusion:** Telemedicine is a novel method of providing e-health to patients with orthopaedic ailments. There is no statistically significant difference in the functional and radiological outcomes between a face to face consultation and telemedicine consultation. Telemedicine consultations were found to have a slightly higher patient satisfaction.

INTRODUCTION

Telemedicine is the delivery of healthcare from a remote location using Integrated computer/communication technology. The current COVID-19 pandemic has led to the increased adoption of telemedicine with national orthopaedic governing bodies advocating it's use. In the wake of the COVID - 19 pandemic the Government of India has legalized telemedicine for registered medical practitioners in the country. Telemedicine can be used as a tool for diagnosis, monitoring, and follow-up of patients. Orthopaedics is one specialty where telemedicine is sparingly practiced. Evidence suggests that telemedicine in orthopaedics can be safe, cost-effective, valid in clinical assessment, and with high patient/clinician satisfaction.[1]

The incorporation of telemedicine in the diagnosis and follow up of these patients would open up a vast majority of health services for those in rural and semi-urban areas of the country with an effectiveness comparable to the conventional ways.[2] The development of more real-time based applications/software like Vitalware, Televital enabled through Indian Space Research Organisation (ISRO) and Sanjeevani enabled through Centre for Development of Advanced Computing (CDAC), Mohali, Punjab, could result in more smartphones being used for teleconsultations.

There is little published information on the effectiveness of Telemedicine in Orthopaedics. Hence at the department of orthopaedic surgery Government Medical College, Kozhikode, we conducted a study is to compare the functional and radiological outcomes of diaphyseal both bone fractures in children treated non-operatively and followed up using telemedicine and face to face consultation.

MATERIALS AND METHODS

Source Of Data/Setting

Children between 5 to 15 years with both bone forearm fractures treated at Orthopaedic Emergency department Government Medical College, Kozhikode between November 2020 to August 2022.

Study Design: A prospective study

Sampling:

A) Sample size:

With an annual incidence of 7% and when the confidence interval is 95%, power is 80%, and alpha error is 0.05 the minimum sample size after using appropriate statistical formula obtained is:

Number of cases in the telemedicine group – 106

Number of cases in the face to face consultation group – 106.

A total of 219 patients were included in the study after taking informed consent and exclusion. 107 patients belonged to the face to face consultation group and 112 patients belonged to the telemedicine consultation group.

B) Inclusion Criteria

1. Children with both bone fractures between 5 to 15 years.
2. Diaphyseal fractures of the proximal, middle and distal 3rd of the radius and ulna
3. Closed fractures
4. Parents having a smartphone with internet and knowing how to use WhatsApp
5. Parents willing to give consent for the study.
6. Parents willing to come for follow up till the end of the study

C) Exclusion Criteria

1. Open fractures of the forearm
2. Neurovascular injuries, compartment syndrome, and local infections
3. Fractures where acceptable reduction cannot be obtained by closed reduction
4. Other skeletal injuries in the ipsilateral upper limb

D) Sampling Procedure

A simple randomization was done for the patients with the help of an online randomization software(www.randomization.com) which generated a randomization plan. All the included patients were allocated into a telemedicine group and a face to face consultation group based on the generated randomization plan.

E) Study Population

The data of 281 patients were collected in government medical college, Kozhikode between the months of November 2020 and August 2022. 17 patients lost follow up (11 in the face to face consultation group and 6 in the telemedicine group). 2 patients were excluded due to refracture before 6 months. 12 patients were excluded due to open fractures. 2 patients were excluded due to compartment syndrome.21 patients were excluded since an acceptable reduction was not able to be attained and an open reduction was needed. 8 patients had skeletal injuries in the ipsilateral upper limb such as supracondylar fracture of the humerus. Finally, 219 patients were included in the study. 107 belonged to the face to face consultation group and 112 belonged to the telemedicine consultation group.

The demographic data including age, gender, type of injury, cause of injury, address, and phone numbers were collected from the emergency department after obtaining an informed consent from the parents. The children were divided into two age groups, 5 to 10 years and 11 to 15 years. Pre-manipulation radiographs were taken and analysed for the side, site and displacement of the fracture. The fractures were classified as proximal 1/3, middle 1/3 and distal 1/3 fractures. The fracture was treated by closed manipulative reduction under adequate analgesia and a plaster of paris slab was applied. The method of reduction was by recreating the initial deformity allowing the fracture to unlock, obtaining length, and reducing angular/rotational deformity followed by careful slab application. Post reduction X-ray images were taken to assess the adequacy of reduction. . If the reduction was acceptable a sling/ arm pouch is given and advice was given to elevate the forearm

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and to mobilise the fingers. All children were observed in the emergency recovery room for about 6 hours and checked for distal neurovascular deficits and the development of edema or compartment syndrome. In case of any doubt regarding any complications, they were admitted to the ward for observation.

Table 1: Acceptable reduction guidelines for paediatric both-bone forearm fractures stratified by age and fracture location,[3]

Patient Age	Angulation (degrees)	Malrotation (degrees)	Bayonet Apposition
0 – 9 years	<15	<45	Yes, if < 1cm short
10 years or older mid/distal shaft	<15	<30	None
10 years or older proximal shaft	<10	0	None
Approaching skeletal maturity (<2years of remaining growth)	0	0	none

All parents were instructed to report back to the emergency department/ to consult the local hospital if there is finger edema, loss of movement, increasing pain, numbness, incessant cry, and fever. Children in both groups were asked to attend the outpatient department after one week. Here the applied long arm slab is converted to a long arm cast and check X-ray images are taken to assess the acceptance of reduction.

Those patients in the telemedicine consultation group were followed up at 2, 4 and 6 weeks in a local government hospital and advised to take an xray of the forearm with elbow and wrist in AP and lateral views. The parents were asked to send a photo of the xray and also of the forearm in the cast to us via Whatsapp. If the quality of the lighting or position of the images was inadequate they were asked to resend the images with the necessary adjustments. The xrays were evaluated using software and the cast was inspected. The patients were called back to our hospital in case of cast breakage, loss of reduction or any complication arises. They were advised to come after 6 weeks for removal of the cast and were sent to the PMR department for mobilization. The patients were evaluated at 2, 4, 6 months and at the end of the study.

The evaluation consisted of assessing the range of elbow flexion, extension, supination and pronation with a goniometer. The wrist flexion and extension limits were also measured using a goniometer. Loss of length of the forearm, radius and ulna were measured. The grip strength of the hand was compared to that of the opposite side. An outcome scoring was given based on the parameters described by Price et al.(4) Xrays were taken and evaluated for displacement, angulation, malrotation, loss of radial bow and ulnar variance. The parents satisfaction was questioned and noted in either excellent, good, satisfactory or poor categories.

Those in the face to face consultation group were followed up similarly in the outpatient department of government medical college Kozhikode.

Statistical Analysis

The data obtained was entered in Microsoft excel software, version 16 and the collected data was analysed with IBM SPSS Statistics for Windows, Version 23.0(Armonk, NY: IBM Corp)

To describe about the data descriptive statistics, frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in independent groups the Unpaired sample t-test was used. To find the significance in qualitative categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In both the above statistical tools the probability value 0.05 is considered as significant level.

RESULTS

A total of 219 patients were studied and the results are as follows:

AGE DISTRIBUTION OF STUDY POPULATION

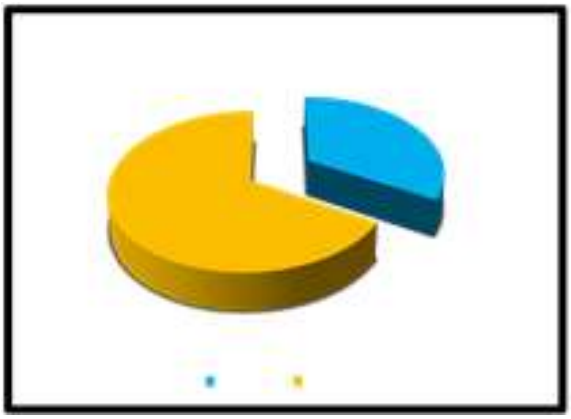

Figure 1: Age distribution of study population

The above figure shows the age distribution of the study population which consists of 33.3 % were 5 - 10 years and 66.7% were 11 – 15 years respectively, the mean ± standard deviation of the age were 11.5± 3 years with maximum of 15 years and minimum of 5 years.

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AGE GROUP DISTRIBUTION AMONG GROUPS

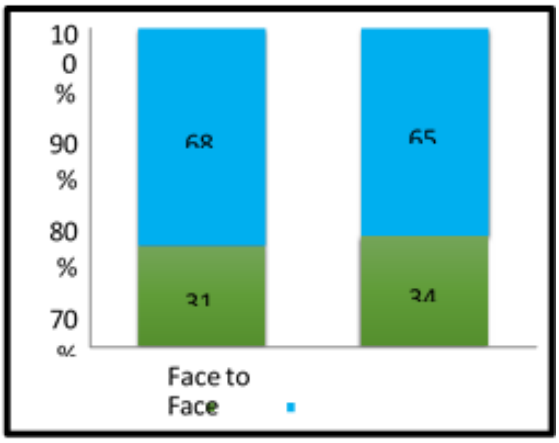

Figure 2: Age group distribution among the two groups

The above table shows the comparison of age groups between groups by using Pearson Chi square test which shows that there is no statistical significance between age with groups, Chi square value= 0.228,p-value= 0.633>0.05, the analysis shows age is equally distributed in both groups of the study population.

Gender distribution of study population:

Out of the 219 patients studies, 169 (77.2%) were male and 50 (22.8%) were females.

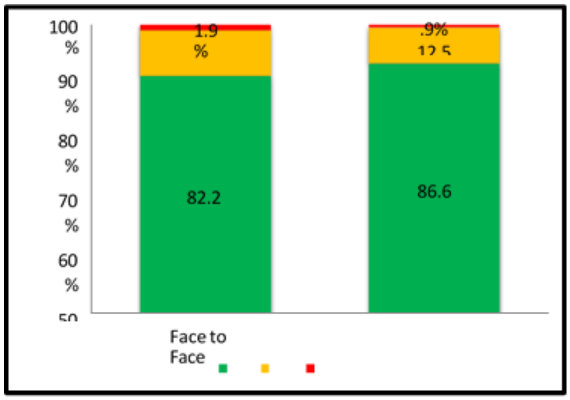

Figure 3: Cause of injury between groups

The above chart shows the comparison of Cause of injury between groups by using Pearson Chi square test which shows that there is no statistical significant cause of injury between groups, Chi square value = 0.948, p- value = 0.623>0.05 level of significance.

SIDE DISTRIBUTION AMONG GROUPS:

Among the face to face to consultation group (107 patients), there was a fracture of the right side in 82 patients (76.6%), left side in 24 patients (22.4%) and bilateral in 1 patient (0.9%).

Among the telemedicine consultation group (112 patients), there was a fracture of the right side in 92 patients (82.1%), left side in 19 patients (17%) and bilateral in 1 patient (0.9%).

The above table shows the comparison of Side between groups by using Pearson Chi square test which shows that there is no statistical significant side between groups, Chi square value= 1.042, p-value= 0.594>0.05 level of significance.

SITE DISTRIBUTION BETWEEN GROUPS:

In the face to face consultation group (107 patients) the site of the fracture was in the proximal one third in 9 patients(8.4%), middle third in 22 patients (20.6%) and in the distal one third in 76 patients (71.0%).

In the telemedicine consultation group (112 patients) the site of the fracture was in the proximal one third in 11 patients (9.8%), middle third in 27 patients (24.1%) and in the distal one third in 74 patients (66.1%).

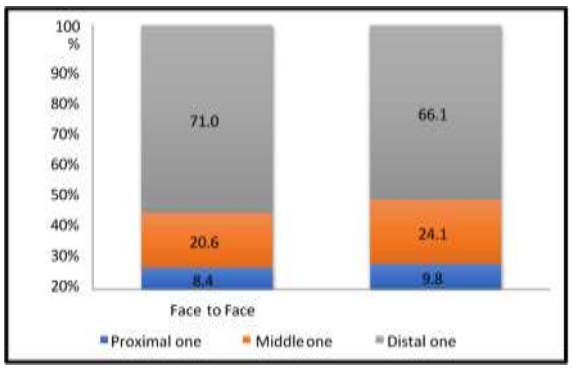

Figure 4: Site distribution among groups

The above table shows the comparison of site between groups by using Pearson Chi square test which shows that there is no statistical significant site between groups, Chi square value = 0.623, p-value = 0.732 >0.05 level of significance.

DISPLACEMENT DISTRIBUTION AMONG GROUPS

In the face to face consultation group (107 patients) the displacement characteristics of the fracture was found to be undisplaced in 47 patients (43.9%), displaced in 43 patients (40.2%) and greenstick fractures in 17 patients (15.9%).

In the telemedicine consultation group (112 patients) the displacement characteristics of the fracture was found to be undisplaced in 55 patients (49.1%), displaced in 43 patients (38.4%) and greenstick fractures in 14 patients (12.5%).

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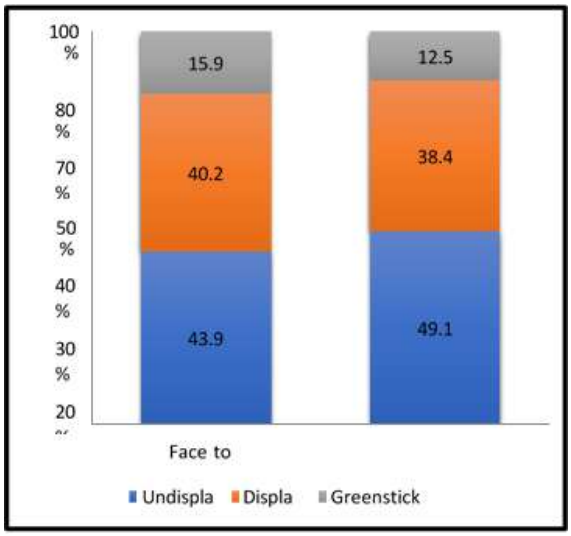

Figure 5: Displacement distribution among groups

The above table shows the comparison of displacement between groups by using Pearson Chi square test which shows that there is no statistical significant displacement between groups, Chi square value= 0.804,p- value= 0.669>0.05 level of significance.

ELBOW FLEXION AND EXTENSION DISTRIBUTION BETWEEN GROUPS

Among the face to face consultation group the elbow flexion was studied and the mean elbow flexion was found to be 148.3 degrees with a standard deviation of 4.6 degrees at 2 months. It was found to be 148.4 degrees with a standard deviation of 4.5 degrees at 4 months and the study end. It was found to be 148.4 degrees with a standard deviation of 4.4 at 6 months.

Among the telemedicine consultation group the elbow flexion was studied and the mean elbow flexion was found to be 148.5 degrees with a standard deviation of 4.3 degrees at 2 months. It was found to be 148.5 degrees with a standard deviation of 4.2 degrees at 4 months. It was found to be 148.6 degrees with a standard deviation of 4.1 at 6months and at the end of the study.

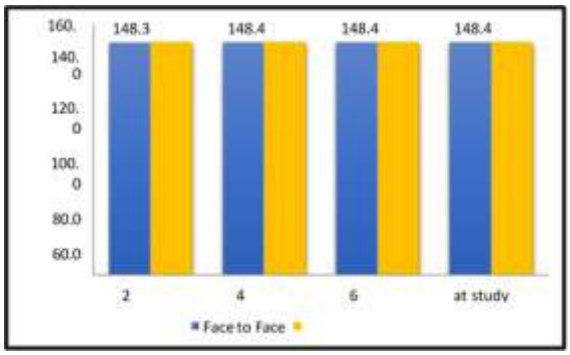

Figure 6: Elbow flexion between groups

The above table shows the comparison of elbow flexion between groups by using Independent sample t-test which shows that there is no statistical significant difference in Elbow flexion between groups in any time duration at p>0.05 level of significance.

Among the face to face consultation group the elbow extension was studied and the mean elbow extension was found to be 0.44 degrees with a standard deviation of 1.35 degrees at 2 months. It was found to be 0.40 degrees with a standard deviation of 1.41 degrees at 4, 6 months and at the end of the study.

Among the telemedicine consultation group the elbow extension was studied and the mean elbow extension was found to be 0.44 degrees with a standard deviation of 1.34 degrees at 2 months. It was found to be 0.40 degrees with a standard deviation of 1.40 degrees at 4, 6 months and at the end of the study.

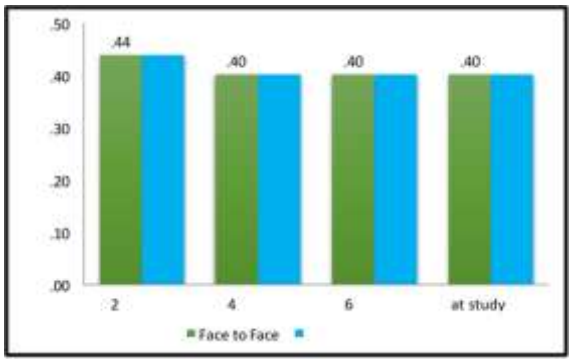

Figure 7: Elbow extension between groups

The above table shows the comparison of elbow extension between groups by using Independent sample t-test which shows that there is no statistical significant difference in Elbow Extension between groups in any time duration at p>0.05 level of significance.

SUPINATION AND PRONATION BETWEEN GROUPS:

Among the face to face consultation group the supination was studied and it was found to have a mean of 88.7 degrees with a SD of 4.6 degrees at 2 months. It was found to be 89.4 degrees with a SD of 4.7 degrees at 4, 6 months and at the end of the study.

Among the telemedicine consultation group the supination was studied and it was found to have a mean of 88.8 degrees with a SD of 4.4 degrees at 2 months. It was found to be 89.5 degrees with a SD of 4.5 degrees at 4 months. The mean of the supination was 89.5 degrees with SD 4.6 degrees at 6 months and at the end of the study.

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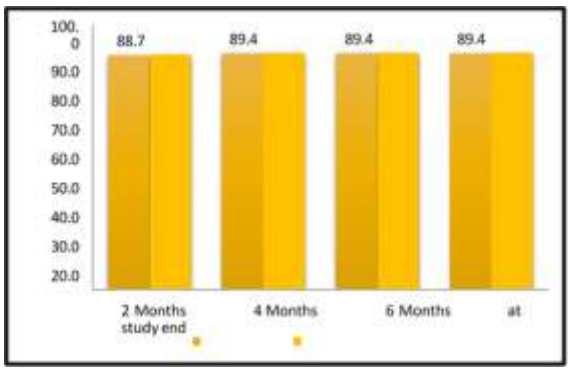

Figure 8: Supination between groups

The above table shows the comparison of supination between groups by using Independent sample t-test which shows that there is no statistical significant difference in supination between groups in any time duration at p>0.05 level of significance.

Among the face to face consultation group the pronation was studied and it was found to have a mean of 79.33 degrees with a SD of 2.8 degrees at 2, 4, 6 months and at the end of the study.

Among the telemedicine consultation group the pronation was studied and it was found to have a mean of 79.26 degrees with a SD of 2.7 degrees at 2, 4, 6 months and at the end of the study.

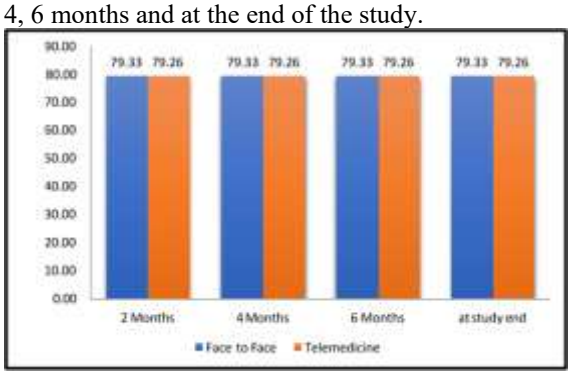

Figure 9: Pronation between groups

The above table shows the comparison of Pronation between groups by using Independent sample t-test which shows that there is no statistical significant difference in Pronation between groups in any time duration at p>0.05 level of significance.

WRIST FLEXION AND EXTENSION BETWEEN GROUPS:

Among the patients in the face to face consultation group the wrist flexion was studied and it was found to have a mean of 89.55 degrees with an SD of 0.73 degrees at 2, 4, 6 months of follow up and at the end of the study.

Among the patients in the telemedicine consultation group the wrist flexion was studied and it was found to have a mean of 89.56 degrees with an SD of 0.67 degrees at 2, 4, 6 months of follow up. At the end of the study it was found to be 89.56 degrees with an SD of 0.69 degrees.

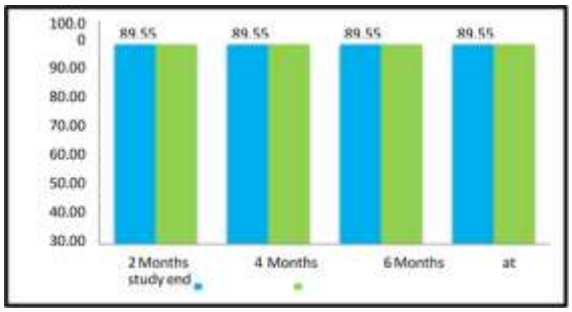

Figure 10: Wrist flexion between groups

The above table shows the comparison of wrist flexion between groups by using Independent sample t-test which shows that there is no statistical significant difference in wrist flexion between groups in any time duration at p>0.05 level of significance.

Among the patients in the face to face consultation group the wrist extension was studied and it was found to have a mean of 69.80 degrees with an SD of 1.56 degrees at 2 months. It was found to be 70 degrees with an SD of 1.17 degrees at 4 months. It was found to be 70.04 degrees with an SD of 1.10 degrees at 6 months and at the end of the study.

Among the patients in the telemedicine consultation group the wrist extension was studied and it was found to have a mean of 69.79 degrees with an SD of 1.45 degrees at 2 months. It was found to be 69.98 degrees with an SD of 1.08 degrees at 4 months. It was found to be 70 degrees with an SD of 1.07 degrees at 6 months and at the end of the study.

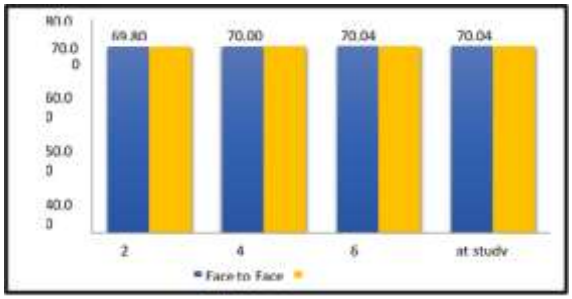

Figure 11: Wrist extension between groups

The above table shows the comparison of Wrist extension between groups by using Independent sample t-test which shows that there is no statistical significant difference in Wrist extension between groups in any time duration at p>0.05 level of significance.

GRIP STRENGTH COMPARISON BETWEEN GROUPS

There was no loss in grip strength in the 219 patients in the study as compared to the opposite side.

COMPARISON OF OUTCOME SCORING BETWEEN THE GROUPS

Table 3: Comparison of Outcome scoring between the groups by Pearson's Chi-Square test

			Groups		Total	χ 2 - value	p-value
			Face to Face	Telemedicine			
2	Excellent	Count	72	78	150	0.140	0.708 #

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Months		%	67.3%	69.6%	68.5%		
	Good	Count	35	34	69		
		%	32.7%	30.4%	31.5%		
4 Months	Excellent	Count	72	78	150	0.140	0.708 #
		%	67.3%	69.6%	68.5%		
	Good	Count	35	34	69		
		%	32.7%	30.4%	31.5%		
6 Months	Excellent	Count	83	87	170	0.000	0.985 #
		%	77.6%	77.7%	77.6%		
	Good	Count	24	25	49		
		%	22.4%	22.3%	22.4%		
at study end	Excellent	Count	83	87	170	0.000	0.985 #
		%	77.6%	77.7%	77.6%		
	Good	Count	24	25	49		
		%	22.4%	22.3%	22.4%		
# No Statistical Significance at p > 0.05 level							

DISPLACEMENT BETWEEN GROUPS

Table 4: Comparison of Displacement between the groups by Independent sample t-test

Duration	Groups	N	Mean	SD	t-value	p-value
2 Months	Face to Face	107	1.78	5.29	0.385	0.701 #
	Telemedicine	112	2.05	5.39		
4 Months	Face to Face	107	1.40	3.93	0.537	0.592 #
	Telemedicine	112	1.70	4.17		
6 Months	Face to Face	107	1.07	3.07	0.701	0.484 #
	Telemedicine	112	1.38	3.44		
at study end	Face to Face	107	0.28	1.51	0.290	0.772 #
	Telemedicine	112	0.22	1.41		
# No Statistical Significance at p > 0.05 level						

ANGULATION BETWEEN GROUPS

Table 5: Comparison of Angulation between the groups by Independent sample t-test

Duration	Groups	N	Mean	SD	t-value	p-value
2 Months	Face to Face	107	2.1	3.1	0.507	0.613 #
	Telemedicine	112	1.9	3.0		
4 Months	Face to Face	107	1.1	2.0	0.499	0.618 #
	Telemedicine	112	1.0	1.9		
6 Months	Face to Face	107	0.5	1.2	0.371	0.711 #
	Telemedicine	112	0.4	1.2		
at study end	Face to Face	107	0.1	0.5	0.948	0.344 #
	Telemedicine	112	0.1	0.4		
# No Statistical Significance at p > 0.05 level						

The above table shows the comparison of Angulation between groups by using Independent sample t-test which shows that there is no statistical significant difference in Angulation between groups in any time duration at p >0.05 level of significance.

COMPARISON OF LOSS OF RADIAL BOW BETWEEN GROUPS

Among the 219 patients studied loss of radial bow was seen in 11 patients (6 in face to face group and 5 in telemedicine group) at 2 and 4 months. It was seen in 5 patients (3 in face to face group and 2 in telemedicine group) at 6 months and at the end of the study.

COMPARISON OF ULNAR VARIANCE BETWEEN GROUPS:

Among the 219 patients studied the ulnar variance was noted and found to be negative in 210 patients (95.9%) and neutral in 9 patients (4.1 patients). There were no positive ulnar variance seen.

COMPARISON OF PATIENT SATISFACTION BETWEEN GROUPS:

In the face to face consultation group (107 patients) the patient satisfaction was questioned and it was found to be excellent in 74 patients (69.2%), good in 23 patients (21.5%) and satisfactory in 10 patients (9.3%) and no parents reported a poor satisfaction rate.

In the telemedicine consultation group (112 patients) the patient satisfaction was questioned and it was found to be excellent in 93patients (83%), good in 14 patients (12.5%) and satisfactory in 5 patients (4.5%) and no parents reported a poor satisfaction rate. The overall satisfaction was found to be higher in the telemedicine consultation group compared to the face to face consultation group.

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Table 6: Comparison of Patient satisfaction between the groups by Pearson's Chi-Square test

Patient Satisfaction		Groups		Total	χ 2 - value	p-value
		Face to Face	Telemedicine			
Excellent	Count	74	93	167	5.906	0.052 #
	%	69.2%	83.0%	76.3%		
Good	Count	23	14	37		
	%	21.5%	12.5%	16.9%		
Satisfactory	Count	10	5	15		
	%	9.3%	4.5%	6.8%		
Total	Count	107	112	219		
	%	100.0%	100.0%	100.0%		

No Statistical Significance at p > 0.05 level

The above table shows the comparison of Patient satisfaction between groups by using Pearson Chi square test which shows that there is no statistical significant Patient satisfaction between groups, Chi square value= 5.906,p- value= 0.052>0.05 level of significance.

DISCUSSION

Telemedicine is a branch of medicine which has recently been gaining popularity since the development of technology. The use of smartphones as a tool for medicine has been on the uprise. The COVID-19 pandemic was one of the stimuli which pushed the application of telemedicine in various branches of medicine.

Literature on the usage of telemedicine in orthopaedics is scarce. Hence in this study we decided to understand the usage of telemedicine as a tool for follow up and if there was any significant difference between a conventional face to face consultation.

Tarmuzi et al retrospectively studied forearm fractures in 48 children aged between 4 to 12 years of age treated by conservative means and the functional outcome was measured in terms of pronation and supination. It was found that 86% of the patients had an excellent functional outcome and none had poor outcomes.[5] Similar functional outcome results were seen in our study with 77.6% of the patients belonging to the face to face consultation group and 77.7% of those in the telemedicine consultation group having an excellent outcome and the remaining 22.4% in the face to face consultation group and 22.3% in the telemedicine consultation group had good outcomes and none of the patients had a fair or poor outcome.

Price et al, Noon et al, Tarmuzi et al, Qairul et al and many authors have suggested recommended acceptable alignment parameters to be assessed with radiographs and those patients who fell into the acceptable alignment parameters had good functional and radiological outcome.[6,7,17,8,9] Similarly in our study these acceptable alignment parameters were followed and all the patients had radiological union with minimal residual deformity with excellent functional results.

Haukipuro et al studied the feasibility of telemedicine for orthopaedic outpatient treatment among 145 patients in a randomized controlled trial and concluded that telemedicine can be used between primary and secondary care of patients. The two patient groups were equally satisfied with the service provided and the telemedicine patients were more willing to have their next visit by telemedicine. However, there were more problems in examining the telemedicine patients.[2] In our study we found similar results where patients belonging to both groups satisfied with their service. In fact the patients belonging to the telemedicine consultation group had slightly higher satisfaction rates as compared to the face to face consultation group.

Haider et al conducted a systematic review of telemedicine in orthopaedics and its potential applications and 21 studies were included. Studies revealed high patient satisfaction with telemedicine in terms of convenience, less waiting and travelling time and was more cost effective. No clinically significant differences were found in the outcome measures.[1] Similarly in our study there was a high patient satisfaction and there was no statistical significant difference in the outcomes. However, the cost effectiveness and convenience of the patients was not measured in our study.

Singh et al conducted a study to show the utility of telemedicine in children in India. 306 patients aged between 0 to 15 years were studied retrospectively. It was concluded that it was possible to provide e-health care through telemedicine to children in rural and semi-urban setting. Our study consisted of a paediatric population aged between 5 to 15 years and telemedicine was able to be provided with good results and high satisfaction rates with the active participation of the parents.

The strengths of our study are that, literature is extremely scarce on studies using telemedicine as a tool for follow up in orthopaedics. All the patients underwent their manipulation by experienced orthopaedic surgeons and the xrays were reviewed and analysed by a single observer.

CONCLUSION

Telemedicine is a novel method of providing e-health to patients with orthopaedic ailments. There is no statistically significant difference in the functional and radiological outcomes between a face to face consultation and telemedicine consultation in diaphyseal both bone fractures of the forearm in children aged between 5 to 15 years treated by non-

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operative methods. Telemedicine consultations were found to have a slightly higher patient satisfaction.

We believe that, with the development of technology and more studies, the utility of telemedicine in orthopaedics as well as different branches of medicine will open up new horizons for the care and follow up of a patient.

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