

Self-Esteem in Children and Adolescents Differently Treated for Locomotory Trauma

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ABSTRACT

Self-esteem involves the evaluative and affective dimensions of self-concept. It could be influenced by stress situations such as diseases or injuries, especially in the period of puberty and adolescence. The aim of this study was to establish the influence of isolated long tubular bone limbs' fractures in children and adolescents and type of its treatment (conservative or active surgical treatment-various techniques) on self-esteem of patients, as well as to establish relationships between self-esteem, depression, anxiety and perception of the social support in the mentioned patients. This prospective clinical trial comprehends 135 patients, 94 male and 41 female, aged 10 to 18, treated for the mentioned fractures in the period from October 2003 until March 2005 in Departments for Pediatric Surgery of three hospitals: the Clinical Hospital Center in Rijeka (88.8% patients), the Clinical Children's Hospital in Zagreb (9.7%), both in Croatia, and 1.5% of the patients in the Clinical Hospital in Mostar (Bosnia and Herzegovina). 53.3% of the patients were treated conservatively, 29.6% of them underwent the elastic stable intramedullary nailing (ESIN), while the remaining 17.1% of the patients were treated with other surgical techniques (AO-plates or Kirschner-wire osteosyntheses). The basic methods of work were self-reported questionnaires: Rosenberg Self-esteem Scale (RSS), to establish the degree of self-esteem; Children Depression Inventory (CDI), to establish existence and degree of depression; Spielberg State Trait Anxiety Inventory (STAI)-form STAI2, to establish general anxiety; and Test of Perception of Social Support (TPSS). RSS, CDI and STAI2 were administered twice to the patients: at baseline and after 6 months of the trauma, whereas TPSS once, after 1 month of the trauma. Our results point at an decreased self-esteem followed by increased depression and increased general anxiety indicators in all patients within 1 week of experienced trauma, especially in those who underwent the ESIN method, whereas after 6 months of the experienced trauma, self-esteem significantly increased and depression and general anxiety indicators were greatly reduced in all patients. The type of treatment of fractures has no influence on the perception of the social support. Our results suggest that the ESIN method (regardless of its good surgical results and advantages in relation to many other surgical techniques) reduces self-esteem more than conservatively treatment of fractures and AO-plates and K-wire osteosyntheses. At the same time self-esteem has been recuperated faster in patients treated with ESIN method. Thus, there is no difference in the influence of the type of the treatment of fractures on self-esteem, but in the dynamics of its recuperation in patients according to type of treatment of fractures. Anyway, from a psychological point of view, any type of surgical treatment could be additional stressor, so it should be practiced with criticism and according to the strict surgical indications.

Key words: adolescents, children, locomotory trauma, different treatments, self-esteem

Introduction

Recently there has been a great interest in psychology in the research of self. Most of this research could be sub-

sumed under the general conception of »self-concept« (or »self-system«) or under the more specifically evaluative

and affective component of self-concept that is usually referred to as »self-esteem« or synonymously as »self-worth« or »self-imagine«¹. This proliferation of interest has been largely stimulated by the emerging important dual role that self-esteem has been given to play both as a human mental health and as a motivational variable, which on the other hand, is identified as a component of emotional intelligence^{2,3}. Self-esteem refers to the positiveness of one's attitude towards oneself, which is widely assumed to be important to healthy developmental outcomes^{4,5}. High levels of self-esteem lead to variety of favorable outcomes such as emotional well-being and stability, social and behavioral adaptation including leadership ability, academic achievement, life satisfaction, decreased anxiety, and even resilience to the emergence of disorder^{6–11}. Conversely, low levels of self-esteem have been linked to higher levels of depression and anxiety, intra and interpersonal difficulties such as loneliness or maladjustment, both in school and social relationships, conduct problems or delinquent behavior, a wide range of health-risk behaviors and outcomes (including substance use, obesity, eating-disorder symptomatology, teen pregnancy, gang membership, even suicidal tendencies and lower levels of self-rated health^{6,12–18}.

Initially, reviews of self-concept research identified a lack of theoretical models and measures for defining and interpreting the constructs, but later researches shifted the focus from studying the self-concept as broad global construct to a view of self-concept as a multifaceted hierarchical construct^{19,20}. Recent results have indicated the importance of considering: multiple, distinct facets of self-esteem; the moderating influence of youth characteristics, environmental experiences and processes in the formation and maintenance of self-esteem; and bi-directional, recursive linkages between self-esteem and adaptive functioning throughout development⁵. Recognition of the multidimensionality of the self has led to a more detailed study of the composition and psychological importance of its components, one of which has been the physical domain. According to some authors, the physical self has occupied a unique position in the self-system, because the body, through its appearance, attributes and abilities provides the substantive interface between the individual and the world²¹. It has also been noted that physical self perception is associated with the aspects of life adjustment such as mood and reported physical and psychological health; with health related behaviors and choice of physical activity, and it affects social communication and interaction^{21,22}.

In consideration of complex, multifaceted structure of self, interactions of its domains, still have not been studied completely, as well as numerous developmental changes during the period of puberty and adolescence, it could be observed that any disease or injury in mentioned developmental period (especially long-term ones), as additional stressor could have some influence on development of self-esteem. Chronic diseases are interesting in this context because of their long-term (even lifetime) course, and injuries because of intensity of living-through.

The influence of some chronic diseases on self-esteem like diabetes mellitus, asthma, or epilepsy are in phase of research^{23,24}, but we did not find any research about the influence of locomotory system injury and type of its treatment on self-esteem in the literature.

On the other hand, until today there has not been found a unique approach in the treatment of long tubular bones' fractures in children and adolescents. Pediatric surgeons' attitudes are divided between the conservative treatment (CT) and the active surgical treatment (AST) of the mentioned fractures. There are also many surgical techniques for treatment of fractures; one of them is elastic stable intramedullary nailing (ESIN), which has many advantages compared to many other techniques^{25,26}. Because of the differences in skeletal trauma of children and adults considering differences in their biology, physiology and pathology, there are also specific needs for principles of treatment of limbs' fractures in children and adolescents. Nowadays, the psychological characteristics of children and adolescents try to be included in the choice of the treatment type of limb fractures; they actually hang on with difficulties of any limitation, especially the physical ones, as well as with the separation from the family and school during longer hospitalization²⁷. Therefore it is a very complex process to care for injured children or adolescents adequately, which includes the importance for professionals to understand the basic reactions of children to the trauma i.e. the complexities of stress responses on several levels, the basic concept of child development, the complexities of parental emotion interactions and relatively long-term relationship with the physician^{28–30}. It is a question if all these circumstances could seriously influence the psychical condition (especially self-esteem) and normal psychical development of children.

For these reasons, the main aim of our study was to establish the influence of isolated long tubular bone limbs' fractures in children and adolescents and type of its treatment (conservative or active surgical treatment-various techniques) on self-esteem of patients. The second aim was to investigate the relationships between self-esteem, depression, general anxiety and perception of social support in mentioned patients.

Material and Methods

Subjects

This study is a part of prospective, comparative and interdisciplinary clinical trial performed on random examinees' sample of children and adolescents with isolated long tubular bones fractures. 135 patients, 94 males and 41 females, aged 10 to 18 years, treated in pediatric surgery departments of 3 university hospitals (in Rijeka and Zagreb, Croatia as well as in Mostar, Bosnia and Herzegovina) in the period from October 2003 till March 2005, participated in the research. The basic excluding criteria for participation were politrauma, fractures of all other bones except long tubular limbs' bones, the age under 10 years (because of methods' limitation) and the age over 18 years (since young adults are not treated in Children's

hospitals). The main part of the research was accomplished in the Department of Pediatric Surgery of the University Hospital Center in Rijeka. Out of 282 children treated there for mentioned fractures in the above mentioned period, 65 of them did not comply with the inclusive age criteria and 58 of them were excluded due to other excluding criteria. 39 patients who would comply with the criteria were not registered on time and were not included in the research for technical reasons. In that way we mobilized 120 patients in Rijeka, while 13 patients at the Clinical Children's Hospital in Zagreb and 2 patients at the University Hospital in Mostar were found by screening accomplished twice in the mentioned period. So we completed a total number of 135 participants in the research. They were classified according to the type of fractures' treatment into three groups: 1. Conservatively Treated Patients (CTP) – 73 of them; 2. ESIN Method Treated Patients (ESIN-MTP) – 40 of them; and 3. Other Surgical Techniques Treated Patients (OST-TP) including AO-plates and K-wire osteosyntheses – 22 of them.

Methods

Socio-demographic information was obtained from the 30 items half-structured demographical questionnaire constructed for the needs of this research and from the medical records. General self-esteem was measured by Rosenberg Self-esteem Scale (RSS), 10 items self-reported questionnaire with yes/no choice answers³¹. For the examination of the basic emotional indicators of the patients the following instruments were used: Children Depression Inventory (CDI) – widely used self-evaluating questionnaire consisted of 27 items with 3 multiple choice answers, to establish the existence and the level of depression in children³² and Spielberg State Anxiety Inventory (STAI) – 20 items self-evaluating questionnaire with 4 multiple choice answers, to establish the existence and the level of general anxiety of patients (since its sub-questionnaire STAI2 was used)³³. Perception of social support was established by Test of Perception of Social Support (TPSS), self-reported questionnaire which was constructed for needs of this study. It contains 4 answers about support of family, friends, children in school and relatives during the treatment of injured patients with 5 multiple choice answers: »full«, »large«, »moderate«, »small«, »none«.

Procedure

The study was reviewed and approved by the medical ethical review board of the Medical Faculty in Rijeka. All the examinees and their parents were informed for the purpose and procedures of the research and signed the informed consent during the first contact with the examiner. An interview with the parents and the children followed, which included information about demographic data. In the end, the patients registered RSS, CDI and STAI2 questionnaires on their own in the presence of the researcher, who was there to explain necessary details. This first step of research (baseline) was accomplished during the first week of the treatment of the fracture. After 1 month of treatment during the visit of the hospital

for follow-up assessments, everyone of the screened patients registered TPSS questionnaire, which was used just once. After 6 months from the injury and from the start of the treatment, patients were asked to visit the hospital to fill up control RSS, CDI and STAI2 questionnaires. At the same time the researcher completed the part of demographical questionnaire linked to the course of treatment and surgery by consulting the medical documentation. All the patients as well as their parents asked for participation in the study accepted it voluntarily, without any payment.

Statistics

The Statistical Package for Social Sciences (SPSS) was used for computing descriptive statistics, correlations, t-tests, chi-square tests and reliability coefficients. For all the adopted questionnaires the reliability of internal consistency expressed with Chronbach alpha coefficient was used. For RSS, CDI and STAI2 questionnaires two-way variance analysis (ANOVA) with one between – factor (type of treatment) and one within – subject factor (first and second measure) were used. As a post-hoc test to differentiate various types of treatment the LSD test was used. For the TPSS questionnaire analysis one-way variance analysis (ANOVA) was used, while as a post-hoc test for supplementary comparison between pair groups (type of treatment) – LSD test was used.

Results

According to demographical distribution as well as distribution of clinical characteristics of the patients in the sample, we found the following results. All three patients groups in the sample had similar age distribution (CTP: M=11.97; SD=1.75; ESIN-MTP: M=12.35; SD=2.42; OST-TP: M=12.95; SD=1.87). More than a half of the examinees were males (M=94; F=41). Fracture location according to the bone type is statistically significantly different among three types of treatment ($\chi^2=67.54$; $p<0.001$). Forearm fractures were treated more frequently conservatively; ESIN method was usually practiced with upper and lower leg bone's fractures, and other surgical treatments were usually used for lower leg fractures. Fracture location according to the bone part is statistically very different among the three types of treatment ($\chi^2=38.42$; $p<0.001$). Conservative treatment and other surgical methods were used more frequently when treated distal parts bones fractures, while the ESIN method has so far been privileged in treating proximal and middle parts (dyaphyses) bones fractures. According to the fracture dynamics, all the fracture samples could be divided in two main types: fall and impact (blow); regardless sustained casually, in traffic accident or like sport injury. In our sample, the cause of fracture was mainly fall, which was mostly treated conservatively, with statistical significance ($\chi^2=29.36$; $p<0.001$). Statistically, the complexity of fractures was significantly different among the three types of treatment ($\chi^2=11.24$; $p=0.024$). Conservative treatment was more used in treating less and middle complex fractures, while ESIN

method and other surgical treatments prevailed in treatment of serious fractures (complex, multifragmentary and segmentary dislocated fractures). All other variables in demographical and clinical distribution, such side or number of fractures, complications and efficiency of treatment were not statistically different according to the type of treatment.

Reliability of internal questionnaire consistency used as instruments in this study expressed with Chrombach alpha coefficient, in the first and the second analyses was as follow: for RSS: 0.713 and 0.675; for CDI: 0.780 and 0.810; for STAI2: 0.863 and 0.810; for TPSS: 0.609. Since normal values vary between 0.600 and 0.900 it is evident that the used questionnaires have great reliability.

According to RSS results (Table 1), three effects statistically significant were achieved: the main measure effect ($F=18.95$; $p=0.001$), and the main type of treatment effect ($F=5.69$; $p=0.004$) and the interactive effect ($F=3.84$; $p=0.024$). The significance of the main measure effect means that self-esteem was higher after 6 months than at baseline, regardless of the type of treatment, while as far as the significance of type of treatment effect, further comparisons between particular pairs of groups according to type of treatment were made. That analysis showed that ESIN-MTP group has significant lower self-esteem than CT group ($p=0.009$) and OST-TP group ($p=0.030$) within 6 months after the injury and the start of the treatment. But at the same time, the self-esteem in ESIN-MTP group recuperated considerably faster than in other 2 groups, which in the end resulted with no statistical significant differences between self-esteem in patients according to the type of treatment, which con-

firmed results of interactive effect. Interactive effect of measure and type of treatment on self-esteem (Figure 1) was also statistically significant which means that changes in self-esteem results between two measures, at baseline and after 6 months, are almost the same, regardless of the type of treatment.

For depression, according to CDI results (Table 2), statistically significant main measure ($F=15.56$; $p<0.001$) and main type of treatment ($F=3.76$; $p=0.026$) effects were achieved, whereas the interactive effect is not significant ($F=1.26$; $p=0.287$). That means that depression in all groups of patients has lower values after 6 months than at baseline, and it was even higher in ESIN-MTP group comparing with other 2 groups at baseline, after 6 months there were no differences among the groups, all this indicates significant reduction of the depression regardless of the type of the treatment.

For general anxiety, according to STAI2 results (Table 3), only statistically significant main measure effect was achieved ($F=7.74$; $p=0.006$), whereas the main type of treatment effect ($F=1.09$; $p=0.338$) and interactive effect ($F=0.09$; $p=0.910$) were not statistically significant. That means that the type of treatment had no influence on general anxiety; in all patients it was greater at baseline and after 6 months was decreased.

TPSS results (Table 4) showed no significant difference in perception of the social support according to type of the treatment ($F=2.32$; $p=0.102$). Perception of the social support was significantly related only with variables of second measure (after 6 months): positively with self-esteem and negatively with other indicators (depression and general anxiety). Thus, greater measured per-

TABLE 1
RESULTS ON RSS SCALE ACCORDING TO THE TYPE OF TREATMENT AND MEASURE

RSS Results	Conservatively treated patients (CTP)		ESIN method treated patients (ESIN MTP)		Other surgical techniques treated patients (OST TP)		Effect of the type of treatment
	X	SD	X	SD	X	SD	
Baseline	8.60	1.47	7.35	2.38	8.86	1.64	$F=5.69$; $p=0.004$
After 6 months	9.00	1.49	8.65	1.58	9.32	1.13	
Effect of measure	$F=18.95$; $p=0.001$						Interactive effect $F=3.84$; $p=0.024$

TABLE 2
RESULTS ON CDI SCALE ACCORDING TO THE TYPE OF TREATMENT AND MEASURE

CDI Results	Conservatively treated patients (CTP)		ESIN method treated patients (ESIN MTP)		Other surgical techniques treated patients (OST TP)		Effect of the type of treatment
	X	SD	X	SD	X	SD	
Baseline	34.37	4.16	37.18	6.75	33.82	3.71	$F=3.76$; $p=0.026$
After 6 months	33.25	5.03	34.65	6.12	32.32	3.08	
Effect of measure	$F=15.56$; $p<0.001$						Interactive effect $F=1.26$; $p=0.287$

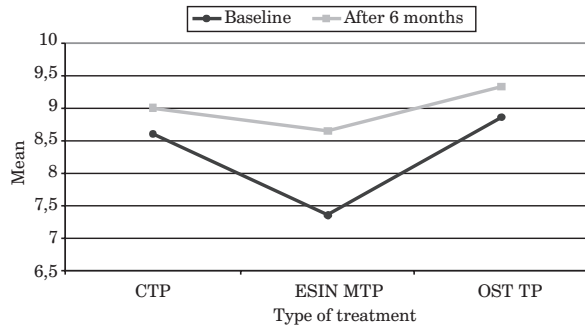


Fig. 1. Interactive effect of measure and type of treatment on self-esteem.

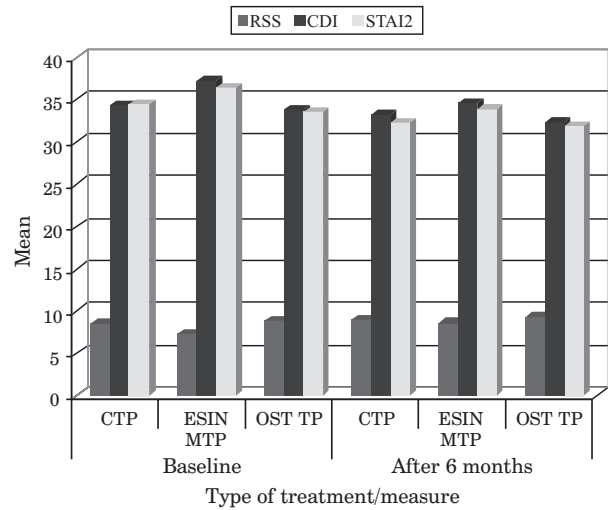


Fig. 2. The relationship between self-esteem (results on RSS Scale), depression (results on CDI Scale) and general anxiety (results on STAI2 Scale) according to the type of treatment and measure.

ception of social support after 1 month of treatment was related to higher self-esteem and lower depression and general anxiety after 6 months of treatment’s start, regardless of the type of the treatment.

The relationship between self-esteem (RSS results), depression (CDI results) and general anxiety (STAI2 results) according to type of treatment and measure is shown on Figure 2. We could see that ESIN-MTP group differed from the other 2 groups with lower self-esteem and higher values of depression and general anxiety at baseline, whereas the values of all three variables after 6 months were practically equalized, which indicates greater oscillation in dynamics of all these three variables in ESIN-MTP group.

Discussion

Considering many advantages of the ESIN surgical method of treatment of long tubular bones’ fractures in relation to the other surgical methods like AO-plates and K-wire osteosyntheses, as well as conservatively treat-

ment of mentioned fractures, and due to the more modern trend of adopting surgical methods of treatment, we tried to establish the place and the efficiency of ESIN surgical method of treating mentioned fractures in children and adolescents and to justify its large (sometimes even routine) usage, by using wider framework. Some of the main advantages of ESIN method are: relatively short hospitalization (only few days) and reduced physical and hygienic limitation of patients. We suppose that self-esteem in ESIN-MTP group would be higher during the treatment because of its advantages, but our results showed the lowest values of self-esteem in this group. It was interesting to find that the self-esteem was highest

TABLE 3
RESULTS ON STAI2 SCALE ACCORDING TO THE TYPE OF TREATMENT AND MEASURE

STAI2 Results	Conservatively treated patients (CTP)		ESIN method treated patients (ESIN MTP)		Other surgical techniques treated patients (OST TP)		Effect of the type of treatment
	X	SD	X	SD	X	SD	
Baseline	34.44	7.49	36.43	10.87	33.50	9.84	F=1.09; p=0.338
After 6 months	32.25	7.10	33.83	8.27	31.82	6.99	
Effect of measure	F=7.74; p=0.006						Interactive effect F=0.09; p=0.910

TABLE 4
RESULTS ON TPSS SCALE ACCORDING TO THE TYPE OF TREATMENT

TPSS Results	Conservatively treated patients (CTP)		ESIN method treated patients (ESIN MTP)		Other surgical techniques treated patients (OST TP)		Analysis	
	X	SD	X	SD	X	SD	F	P
After 1 month	16.38	2.82	17.30	2.62	17.50	2.24	2.32	0.102

in OST-TP group. Patients in both of these groups were treated surgically, under general anesthesia, so why then such differences in self-esteem? The answer is maybe lying in the amount of osteosynthetic material using in osteosynthesis: while in OST-TP it is usually very small (plate or wire) with no visible or tactile manifestation, in ESIN-MTP is using Nancy-Prévoit nail passing through all length of bone, making tactile or sometime visible manifestation in proximal or distal part of the bone. That could possibly have some influences on the physical state in the period of development, especially in adolescence, which is the main period of integration of the self, and the body and its image is very important to the young patient. As physical and psychical self components are closely related and have an influence to each other, it is clear that any physical change would have an influence on person's psychical state. But, it is not completely clear in which part of the injury itself or its treatment influenced self-esteem. We also confirmed a very well known fact that self-esteem is negatively connected to the depression and general anxiety, and positively connected to the perception of the social support^{1,13}. In our research, depression has almost the same dynamics as self-esteem, while general anxiety has no significant importance.

Limitations of our study were: the self-reported nature of the data collection, with insufficient objective findings; the choice of instrument for self-esteem because of its global and not multifaceted dimension; the lack of the prospective dimension of the perception of social support and the lack of bibliography in the field.

As a conclusion we could say that the type of treatment of long tubular bones' fractures in children and adolescents has no significant influence on self-esteem: even though it decreased immediately after the injury and the start of the treatment, regardless of its type, it recuperated proportionally during the time. Anyway, a need of holistic and individual approach to the patient has been promoted and in that context there should be an open possibility for psychological support for the patients with injury in cases they need it.

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SAMOPOŠTOVANJE U DJECE I ADOLESCENATA RAZLIČITO LIJEČENIH ZBOG LOKOMOTORNE TRAUME

S A Ž E T A K

Samopoštovanje uključuje evaluativnu i afektivnu dimenziju samopojmanja. Na samopoštovanje mogu utjecati stresne situacije kao što su bolesti ili ozljede, pogotovo u razdoblju puberteta i adolescencije. Cilj je ovog istraživanja utvrditi utjecaj izoliranih prijeloma dugih cjevastih kostiju ekstremiteta u djece i adolescenata i vrste njihovog liječenja (konzervativno ili aktivno kirurško liječenje – različite tehnike) na samopoštovanje pacijenata, kao i utvrditi veze između samopoštovanja, depresivnosti, anksioznosti i percepcije socijalne potpore u navedenih pacijenata. Ovo prospektivno kliničko istraživanje obuhvaća 135 pacijenata, 94 muškog i 41 ženskoga spola, dobi 10–18 godina, liječenih zbog navedenih prijeloma u razdoblju od listopada 2003. do ožujka 2005. godine na Odjelima za dječju kirurgiju triju bolnica: Kliničkog bolničkog centra u Rijeci (88.8% pacijenata) i Dječje kliničke bolnice u Zagrebu (9.7% pacijenata), Hrvatska, te 1.5% pacijenata u Kliničkoj bolnici u Mostaru, Bosna i Hercegovina. Kod 53.3% svih pacijenata prijelomi su bili liječeni konzervativno; kod 29.6% njih elastičnom stabilnom intramedularnom osteosintezom (engl. Elastic Stable Intramedullary Nailing, ESIN); dok je 17.1% njih liječeno drugim kirurškim tehnikama (osteosinteza Kirschnerovom žicom ili AO pločicama). Osnovne metode rada bili su samoprocjenski upitnici: Rosenbergova skala samopoštovanja (engl. Rosenberg Self-esteem Scale, RSS), za utvrđivanje stupnja samopoštovanja; Skala dječje depresivnosti (engl. Children Depression Inventory, CDI), za utvrđivanje postojanja i stupnja depresivnosti; Spielbergova skala anksioznosti (engl. Spielberg State Trait Anxiety Inventory, STAI2), za utvrđivanje opće anksioznosti; te Test percepcije socijalne potpore (engl. Test of Perception of Social Support, TPSS). RSS, CDI i STAI2 pacijenti su ispunili u dva navrata: neposredno nakon traume te nakon 6 mjeseci, dok je TPSS bio ispunjen jednokratno, 1 mjesec nakon traume. Naši rezultati ukazuju na smanjeno samopoštovanje praćeno povećanom depresivnošću i općom anksioznošću kod svih pacijenata unutar 1 tjedan od traume, pogotovo u onih liječenih ESIN metodom, dok se nakon 6 mjeseci od traume samopoštovanje značajno povećalo, a depresivnost i opća anksioznost uvelike smanjile kod svih pacijenata. Vrsta liječenja prijeloma nije utjecala na percepciju socijalne potpore. Rezultati sugeriraju da ESIN metoda (bez obzira na njezine dobre kirurške rezultate i prednosti u odnosu na brojne druge kirurške tehnike) smanjuje samopoštovanje pacijenata tijekom liječenja prijeloma više nego konzervativno liječenje te osteosinteza Kirschnerovom žicom ili AO pločicama. Istovremeno, samopoštovanje se oporavlja najbrže upravo kod pacijenata liječenih ESIN metodom. Dakle, nema razlike u utjecaju vrste liječenja prijeloma na samopoštovanje, već je razlika u dinamici oporavka samopoštovanja pacijenata obzirom na vrstu liječenja prijeloma. U svakom slučaju, s psihološkog stanovišta, svaka vrsta kirurškog liječenja prijeloma u djece mogla bi biti dodatni stresor, te bi se stoga trebala primjenjivati kritički i prema striktnim kirurškim indikacijama.