

Evaluation of differences in health-related quality of life during the treatment of post-burn scars in pre-school and school children

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Abstract

Objective. The aim of the research was an assessment of the differences in the self-evaluation of health-related quality of life during the treatment of post-burn scars on the upper limbs of pre-school and school children.

Materials and method. A group of 120 children were examined – 66 boys and 54 girls, divided into a pre-school group of 60 children (average age 4.3 ± 1.7) and a primary school group of 60 children (average age 10.4 ± 1.2). The structured interview and an adopted Visual Analog Anxiety Scale and Visual Analog Unpleasant Events Tolerance Scale were used to evaluate the level of plaster tolerance, and anxiety caused by the removal of dressings during treatment.

Results. In the first test, in both groups, a low tolerance was noted to the pressure plaster, with the pre-school aged children obtaining worse results ($x=18.9 \pm SD 10.16$) than those of school age ($x=33.65 \pm SD 13.21$), regardless of gender. Pre-school children were afraid ($x=47.5 \pm SD 24.26$), while school-aged children were not afraid of having the plaster removed ($x=20.5 \pm SD 9.46$). The differences between the groups were statistically significant. In the fourth and final test on pre-school aged children, the tolerance of plasters had improved ($x=23.24 \pm SD 15.43$) obtaining a value somewhat lower than for school-aged children ($32.4 \pm SD 6.45$), as well as a noted fall in the anxiety level ($30.83 \pm SD 23.38$) with an average value insignificantly higher than that recorded for the children of school age ($15.83 \pm SD 6.19$).

Conclusions. The tests confirmed the appearance of differences in the self-evaluation of health-related life quality in pre-school and school-aged children.

Key words

burns, affective symptoms, pain, anxiety

INTRODUCTION

It is difficult to find academic articles within the worldwide subject literature devoted to an evaluation of health-related quality of life for pre-school and school children treated for burns to the upper limbs which take into consideration an evaluation of the young patients themselves [1, 2, 3, 4, 5, 6].

The authors, in describing the quality of life of these children, have based their study largely on the observations and perceptions of researchers and parents, rather than asking children or young people themselves [7]. Cohort tests covering large groups of children show that children with hand burns have significantly worse outcomes than children with burns in other areas [1]. Post-burn scars can be devastating and disfiguring, because they are clearly visible, stigmatizing, and permanent reminders of the initial accident [2]. Van Loey et al. [6] described how scars might contribute to impact on social anxiety and increase post-traumatic stress syndrome, since pressure garments or red and disfiguring scars can attract too much attention from other people, which may induce feelings of shame. Authors presenting the subject of the long-term treatment and psycho-social rehabilitation of children with burns most frequently analyse the body picture, changes in the social functioning, as well

as the raising of psycho-social rehabilitation standards [3, 4], while at the same time on clinical observations they show that pre-school and school children complain about:

1. Problems resulting from the need for the long-term and arduous treatment of burn scars; here, chiefly the states of anxiety and fear brought about by the pain experienced during the process of being burnt, as well as the treatment of the burnt wound, particularly the changing of plasters,
2. A lack of tolerance for the treatment methods employing pressure plasters.

In the opinion of these young patients, as well as in the view of their parents and guardians, these problems are the main cause for a worsening in the children's quality of life during the course of the treatment of burn scars on the upper limbs. Therefore, there is a need for a more detailed evaluation of the significance of these problems for the quality of life of a burn patient during the course of the complicated and time-consuming process of treatment.

Although it is at times difficult, there is a need to assemble such information to allow the raising of treatment standards. In testing such children, it is essential to realise that a small child is often frightened and untrusting as a result of the stress caused by the treatment of burn wounds [2], and that it is difficult to gain sufficient trust in order to obtain reliable relevant information. An additional problem is the two-year minimum period for post-burn scar treatment, which is often not understood and difficult for the child to accept. This period is often connected with an inability for the child to

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function in a normal active way, which results in frustration and impatience [5]. Attempts to explain the necessity for a series of activities connected with the long-term treatment of post-burn scars often brings no effects and heightens the sense of a deterioration in the quality of life [7].

There is no universal agreement among researchers as to the way to define 'quality of life'. Studies involving adults have examined, for example:

- independence in activities of daily living;
- behavioural problems;
- social competence;
- academic performance;
- parental stress.

Studies on children have focused on the child's mental status, examination and developmental history, pain and symptoms, motor functioning, autonomy, cognitive, emotional and social functioning [2, 8, 9].

The concept of Health Related Quality of Life (HRQOL) refers to the state of health broadly understood as well as the specifics of a given disease. Such an approach has been proposed by Pačalska et al. [10] who conjecture that the starting category for the conducting of tests in relation to quality of life is a description of the specifics of a given disease (determined not merely on the basis of clinical tests, but also on the evaluation of post-burn scar maturity). Of significance here are biological factors, the process of scarring is dependent on the surface area, the depth and location of the burn wound, psychological (including coping with the consequences of a deep burn), as well as the social consequences of the injury for the young patient (social isolation and the fear/anxiety associated with this). This model therefore enables the quality of life to be combined with the pain and other negative emotions which appear following a burn which, as a state, is adopted as the main factor shaping quality of life [1, 2, 10]. All these aspects create the profile by which the child perceives the scar, they shape the process of reaction to having a scar and its evolution over time, as well as the strategies for coping with the psychosocial consequences which come with burning.

In the presented work, the above model has been adopted for the quality of life, narrowing down the evaluation of health related quality of life in the case of burns to the upper limbs to the two most important parameters complained about by children, evaluation of the following:

1. the treatment method employing a pressure plaster;
2. the fear associated with plaster removal.

Clinical observations also indicate differences in the reactions connected with the treatment of pre-school children and school children, as well as varied evaluations in the range of the above-mentioned parameters for the quality of life.

The aim of the study was to evaluate the differences in health-related quality of life self-evaluation during the course of treating burn scars of the upper limbs, as perceived by pre-school and school children.

MATERIALS AND METHOD

The study encompassed a group of 120 children – 66 boys and 54 girls, divided into two equal groups according to age, treated at the University Children's Hospital in Kraków. The first, preschool group, consisted of 60 children (30 boys and 30 girls), average age 4.3 years \pm 1.7. The second, primary school children group, consisted of 60 children (36 boys and 24 girls), average age 10.4 years \pm 1.2. (Tab. 1).

Table 1. Characteristics of the examined groups.

Examined groups	Boys	Girls	Total
Pre-school children (3–7 years)	30 (50%) 4.6 (SD =1.4)	30 (50%) 3.9 (SD =1.4)	60 4.3 (SD =1.2)
Primary school children (8–13 years)	36 (60%) 11.1 (SD =1.2)	24 (40%) 9.8 (SD =1.2)	60 10.4 (SD =3.1)
Total	66 (55%)	54 (40%)	120

The children from both groups were suffering after deep upper extremity burns. The burn depth was classified as deep 2nd degree burns. The inclusion criteria for both groups

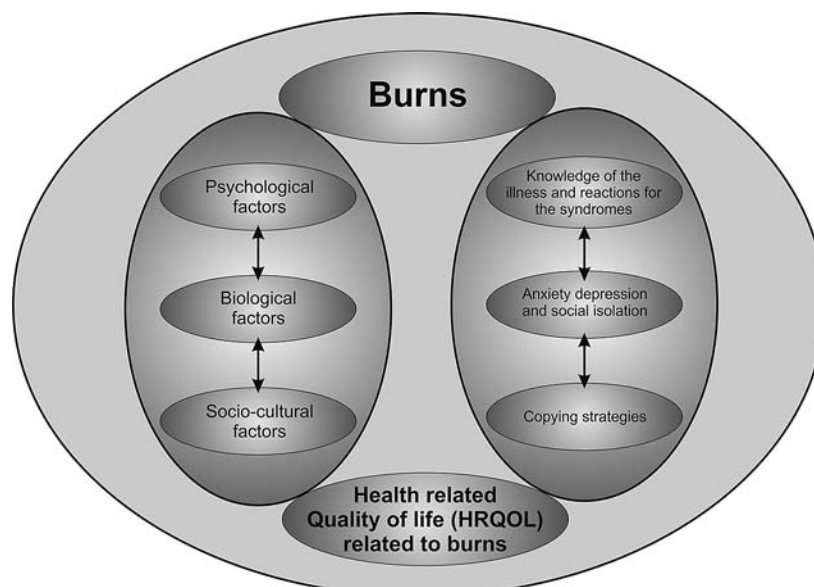


Figure 1. A general biopsychological model of quality of life connected with a child's state of health after heat burns. Source: own work on the basis of Pačalska [10]



was conservative wound treatment with a healing time of between 16–21 days. The exclusion criteria was delayed wound treatment with the necessity for conversion from conservative to surgical treatment (a split thickness skin graft), and a healing time shorter than 16 days (minimal risk of scaring process).

Method of treatment. All the children, both from the pre-school and school-aged groups were treated by means of pressure therapy using a pressure plaster, which was commenced two months after the healing of the wound itself, and stopped after 18 months of treatment. The pressure plaster was changed once a week, removing the old and placing a new one on the scar together with the adjacent healthy skin, which ensured pressure being exerted on the immature scar; this did not limit the children in the performance of everyday activities, particularly in taking a bath.

A clinical interview was used in the tests, an adapted 100 mm Visual Analog Unpleasant Events Tolerance Scale, and a Sad-Happy Face Scale: 0 mm on the scale represented a lack of tolerance of the treatment method by means of the pressure plaster, while 100 mm on the scale – a total tolerance of the pressure plaster, as well as an adapted 100 mm Visual Analog Anxiety Scale, and a Peaceful Face-Fearful Face Scale: 0 mm on the scale represented an absence of fear, while 100 mm – intense fear of removal of the dressing.

Each child was examined 4 times: the 1st examination was conducted 3 months after applying the pressure plaster and then for the 2nd time – 6 months, 3rd time – 12 months, and the 4th and final time, 18 months after the pressure plaster was initially applied.

Test procedure. The children were asked to show tolerance of the method of healing by the use of a compression plaster or the level of anxiety prior to the removal of the plaster by indicating a point on the adapted scales: Visual Analog Unpleasant Events Tolerance Scale and Visual Analog Anxiety Scale.

For data analysis, the Excel 2007 Statistics package (Microsoft Office) was used. Descriptive statistics were used where the results in the respective groups were shown as the mean, standard deviation, and minimal and maximal values. To detect statistically significant differences, Students t° – test for independent samples and paired samples was used. The consent of the patients, as well as the approval of the local Bioethics Commission was obtained to carry out this study.

RESULTS

Level of tolerance to treatment methods with a pressure plaster. The average level of tolerance to treatment with a pressure plaster for both groups tested is presented in Table 2.

At the beginning of treatment, in the first test, there was noted in both groups and regardless of gender, a low tolerance to treatment with a pressure plaster. The average level of tolerance for pre-school children was ($x=18.9 \pm SD = 10.16$), while in children of school-age it was close to twice as high, although it was still low ($x=33.65 \pm SD = 13.21$). The differences obtained between the groups were statistically significant ($p=0.001$).

The tolerance to treatment in the form of a pressure plaster improved somewhat during the course of treatment, although

Table 2. Average level of tolerance to treatment with a pressure plaster

Time	MEAN/SD	Pre-school children (3–7 years)			School children (8–13 years)		
		Boys	Girls	Total	Boys	Girls	Total
3 months	MEAN	17.78	20.87	18.91	34.98	31.42	33.65
	SD	13.35	17.94	10.16	10.24	10.15	13.21
6 months	MEAN	21.67	23.15	21.92	35.85	30.54	32.74
	SD	20.08	20.13	16.25	19.45	23.34	14.76
12 months	MEAN	27.07	25.78	26.68	39.07	32.87	37.12
	SD	15.09	18.05	16.57	14.98	34.45	12.87
18 months	MEAN	24.54	21.37	23.24	33.98	30.56	32.40
	SD	15.65	17.34	15.43	6.15	7.37	6.45

it still remained low, while in school children it remained constantly at a similar level.

The difference obtained between the 1st test and the 4th in the group of pre-school children was significant at the level of $p = 0.001$, while in the group of school children this difference was not significant ($p=0.23$).

In the 4th (final) test, no significant differences were noted between the pre-school group and the group of school children.

Level of fear/anxiety before plaster removal. The average level of fear/anxiety on the removal of the plaster in both groups is presented in Table 3.

Table 3. Average level of fear/anxiety on plaster removal

Time	MEAN/SD	Pre-school children (3–7 years)			School children (8–13 years)		
		Boys	Girls	Total	Boys	Girls	Total
3 months	MEAN	44.17	50.83	47.50	20.56	20.41	20.50
	SD	23.38	24.99	24.26	9.24	9.99	9.46
6 months	MEAN	38.33	37.50	37.92	17.78	20.41	18.83
	SD	21.51	26.87	24.13	8.32	9.08	8.65
12 months	MEAN	41.67	42.50	42.08	21.11	15.83	19.17
	SD	23.97	25.55	25.57	7.85	6.54	7.76
18 months	MEAN	33.33	35.83	30.83	15.28	16.67	15.83
	SD	25.49	27.61	23.38	6.09	6.37	6.19

In the first test, at the commencement of treatment, there was noted among the pre-school children an average level of fear/anxiety on the removal of the plaster ($x=47.5 \pm SD = 24.26$), as well as a low level of fear/anxiety in children of school age ($x=20.5 \pm SD = 9.46$). It can be noted that in pre-school children this level was more than twice the value recorded in school children, regardless of gender. The differences obtained between the groups was statistically significant ($p=0.001$).

In the 4th (final) test, a reduction was confirmed in the fear/anxiety prior to application of the pressure plaster. The level of fear in pre-school children was relatively low ($30.83 \pm SD 23.38$), while for school children, it was extremely low ($x=15.83 \pm SD = 6.19$).

The difference obtained between the 1st and 4th test in the pre-school group was significant at the level of $p = 0.001$, while for children of school age this difference was not significant ($p=0.23$).

A comparison of the results obtained in the 4th (final) test with the 1st test showed an absence of significant differences between the tested groups of pre-school and school children ($p=0.27$).

DISCUSSION

The presentation in this article of pioneering tests on the evaluation of the differences in self-assessment of an improvement in quality of life for pre-school and school children, provides an answer to a hitherto gap in both the Polish and international subject literature [11]. It indicates the correctness of the general adoption of a biopsychological model of health-related quality of life of children following heat burns. Differences were noted in the evaluation of health-related quality of life in the case of pre-school and school children with burns to their upper extremities. These referred to the two most important parameters complained of by the children, namely:

1. evaluation of the tolerance of pressure plaster treatment;
2. evaluation of fear/anxiety associated with the process of scar treatment (in particular removal of the dressing).

The differences in the self-evaluation of health-related quality of life in the course of treating burn scars of the Upper extremities as presented by pre-school and school children involved:

1. the average level of toleration of treatment methods with a plaster were noticeably lower in pre-school children than those of school age, regardless of gender, while the average level of fear/anxiety about removal of the plaster was much higher in pre-school children than in children of school age, regardless of gender;
2. the dynamics of the changes in the treatment process covers an improvement in the tolerance of treatment with a pressure plaster. The two-fold improvement noted in the tolerance shown towards treatment with the plaster displayed by pre-school children may be chiefly connected with the process of growing up. This proved to be an important factor differentiating these children – their awareness of the burn understood as the level of knowledge about burn scars, as well as of the necessity for the long-term treatment of these scars [1, 10]. There was no total awareness of burns in pre-school children, or of their consequences for the human organism. In accordance with microgenetic theory [12, 13] an individual with even an incomplete awareness/ consciousness is deprived of the possibility to create their perception of a temporally changing burn scar, and the associated need for the treatment of these scars. As a result of this, they fear the temporally unknown procedures for the treatment of these scars. Fear/anxiety, therefore, concerns the activities which take place around these scars. Consequently, the small child does not fully activate the nervous system, while the process of adaptation may last for weeks, months, and sometimes even years. In turn, an older child does not feel fear/anxiety in connection with the care and treatment of scars, but experiences displeasure in having the scar itself [14, 15, 16]. From this, evolves the conclusion that although the quality of life deteriorates after a burn equally for both the pre-school children and those of school age, and the causes of this deterioration are varied.

In the course of the treatment of a scar, both pre-school and school-age children pass through various mental states in their comprehension of the significance/meaning of their treatment process. It is worth adding that although the scar is viewed during the course of dressing changes, which initially

is red and, with time, visibly undergoes a process of becoming paler until it finally merges into the colour of the skin, it is the psychological reactions and the quality of life connected with the scar that lead to differences in both age groups, and not only in these age groups. This happens because every person has an individual model of the world which is connected with their identity, personality, knowledge and life experience. Of significance is the level of the different awareness of symptoms dependant on the patient's age.

It is worth remembering that awareness within the concept of the majority of the theory is linked first and foremost with knowledge on the subject of the surrounding World, and the knowledge of one's self. However, clinical practice clearly shows that consciousness does not represent simply knowledge, but involves man's relationship with the reality that surrounds him [12, 13], that is, the relationship of I – the world [10]. An extremely important role is played here by cognitive and emotional processes. These elements present the model of disturbances illustrated by Figure 2.

This model in its essence relates to the structure of 'I' in relation to the brain, mind, and the surrounding world, as well as constituting a synthesis and discussion about the approach proposed by Pačalska and others. [10]. The central place in this model is occupied by 'I', where the relation of 'I' to the brain, mind, and the world fulfills an important role in the 'sculpting' of conscious and sub-conscious processes. The grey circles present cognitive processes, such as: attention, memory or thought, as well as drives, needs and emotions. The processes shown in the model can occur both consciously and subconsciously, while the elements are dynamically presented without marking the direction of their course, for the cognitive and emotional processes may combine in a variable and dynamic way which induces a variable level of consciousness.

This model therefore explains the difference obtained in the tests conducted In the presented study into health-related quality of life in the course of the treatment of burn scars of the upper extremities in pre-school and school children.

In summing-up, it is worth emphasising that the results of the tests brought an extremely important observation for modern treatment, that care of the scar should be blended with care for the patient's psychological condition in order to improve the quality of life after the burn [14, 15, 16, 17, 18]. The child's parents or guardians should be included into the care programme [19].

The observations made by other authors [17, 20] were confirmed. It was found that if we include innovative clinical thinking and combine new methods in scar treatment with an intimate knowledge of the child, and incorporation of the family within this care programme, we are able to significantly improve the quality of the medical services offered.

CONCLUSIONS

Result of the tests conducted confirmed the appearance of differences in the self-evaluation of health-related quality of life during the course of scar treatment of the upper limbs, as presented by pre-school and school children. Therefore:

1. In the 1st test, the average level of tolerance for pressure plaster treatment methods was noticeably lower in pre-school children than in those of school age, regardless



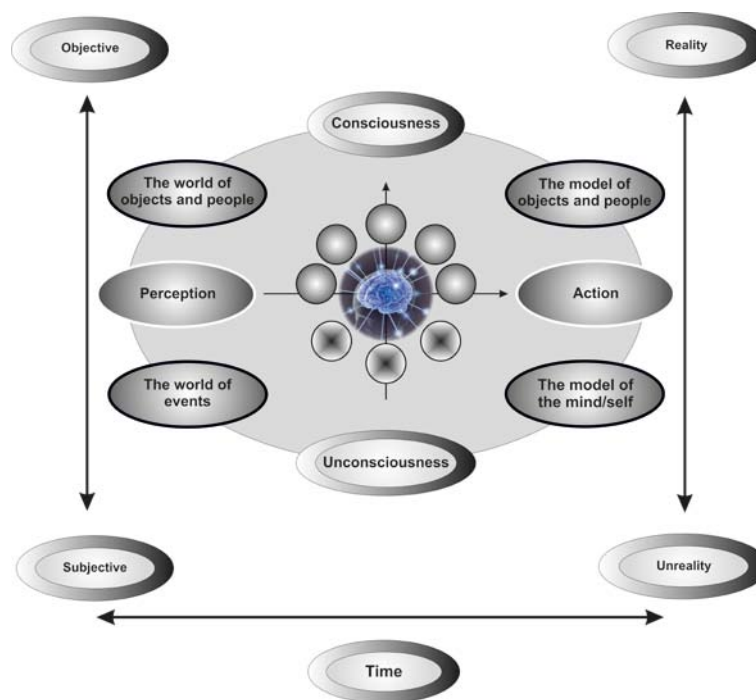


Figure 2. Model of consciousness.
Source: Pačalska et al. [10]. With the authors' permission

- of gender. Equally, the average level of fear/anxiety on removal of the dressing was noticeably higher in pre-school children than in those of school age, regardless of gender.
2. Towards the end of treatment, in the 4th and final test, the differences in the level of tolerance to the pressure plaster treatment method in both of the tested groups, as well as the anxiety experienced on removal of the plaster, diminished.
 3. The changes obtained in health-related life quality improvement following burns in pre-school children may be connected with the process of growing-up, and the gaining of an awareness of the need for long-term treatment of the burn scar. These changes may be explained by the model of consciousness in accordance with microgenetic theory, which places emphasis on a knowledge of a disease in the process of the perception of symptoms, and therefore the discomfort experienced by having a pressure plaster and the fear/anxiety suffered before its removal.

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