

Assessment of Medical Clowning in Influencing the Anxiety and Behavior Scores of Children Undergoing Various Dental Treatments and the Stress Levels of the Operator

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ABSTRACT

Aim: To investigate the potential effectiveness of “medical clowns” on preoperative, intraoperative, and postoperative anxiety of children undergoing various dental treatments and also its effect on the operator’s stress levels in a dental setup.

Materials and methods: A total of 170 pediatric patients, aged 4–8 years, indicated for preventive therapy, extractions, restorative, and endodontics were included and divided into two groups [group I—audiovisual (A-V) aids; group II—medical clowns], group of 85 patients each after recording Modified yale preoperative scale. Both pre- and postoperatively, Frankl’s behavior score was recorded for each patient. During treatment, the face, legs, activity, cry, consolability (FLACC) pain scale, and dental operator’s stress level were recorded.

Results: Intervention of medical clowns positively influenced children during dental treatment by increasing their pain threshold. The majority of children showed positive Frankl rating scales after dental treatment. Also, the operator’s stress was significantly reduced, which led to enhanced treatment outcomes.

Conclusion: Humor yields the power of healing, distracts pediatric patients, reduces their anxiety, and alleviates their pain, conferring the patients with a sense of laughter, creativity, and care.

Therefore, medical clowns in pediatric dentistry can prove to be serviceable and valuable as a nonpharmacological approach to behavior management.

Keywords: Behavior management, Clown doctors, Distraction, Humor, Laughter, Medical clowns.

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INTRODUCTION

Pain, fear, and anxiety are common emotions experienced by children in a dental setup, which further affect the overall outcome of the attitude and behavior of a child during treatment. The overall effect of dental fear and anxiety appears to be multifaceted, leading to compromised oral health and long-term negative emotional and psychological reactions. There are variations of emotions portrayed by pediatric patients in the form of worrying, whining, and throwing tantrums, or it can even worsen to the extent of kicking and crying forcefully.

Very well-articulated by McElroy in 1895 “although the operative dentistry may be perfect, the appointment is a failure if the child departs in tears.” Therefore, to decrease the unwanted reactions of a child and to enhance the practice of pediatric dentists, various behavior management approaches have been used through decades to instill a positive attitude toward dental treatment and to create long-term interest on the patient’s part, amplifying treatment outcomes and oral health in the future. The introduction of nonpharmacological techniques in pediatric dentistry, which includes cognitive psychological approaches like modeling, and distraction methods like videos, audiovisual (A-V) aids, etc., are known to increase the pain threshold and help a child to cope with anxiety, directly enhancing a positive dental attitude.¹ In dental setup, not only patients but pediatric dentists are also associated with an increased level of stress and anxiety while treating anxious patients. Research says that anxiety in patients is one of the contributing factors to a dentist’s stress. An anxious patient requires

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extra time and special strategies to achieve the best treatment possible, which indeed increases the dentist’s anxiety.²

One of the nonpharmacological approaches that are gaining importance in medical and healthcare setup is “medical clowning” also known by other names as “hospital clowns,” “therapeutic clowns,” and “clown doctors,” which builds a positive environment for patients, reducing their anxiety which further reduces the anxiety of doctors and nurses too.³

“To truly laugh, you must be able to take your pain and play with it!” by Charlie Chaplin.

Based on this concept, Adams, as a young physician in the 70s, began clowning for hospital patients.⁴ For decades, the effect of the medical clown has been assessed in various medical procedures,

such as intraarticular injection for juvenile rheumatoid arthritis and during cardiac biopsies performed during cardiac catheterization in heart transplant recipients.⁵ Clown care was successful in alleviating pain sensations during botulinum toxin injections in cerebral palsy children, too.

The literature says that medical clown works on a few principles and strategies that are:

- Distraction: This reduces anxiety and pain by diverting children's attention.
- Laughter and humor: By releasing endorphins and decreasing stress hormones, it acts as a stress reliever, thus improving a child's behavior too.
- Cognitive coping: Encouraging a child to cope with the challenge.
- Guided imagination: Coping with anxiety by imagining something pleasant and joyful.
- Emotional reflections: To allow the child to react freely with unexaggerated emotions.

The "key of laughter" in the form of medical clowns is playing a crucial role as the "key of healing" in various medical treatment modalities. The literature stated a handful of evidence of the effectiveness of clown doctors in medical hospitals in various countries, including India. However, to date, there is hardly any literature on the use of medical clowns in pediatric dentistry. Therefore, this study was designed to investigate the potential effectiveness of medical clowns on preoperative, intraoperative, and postoperative anxiety of children undergoing various dental treatments and also its effect on the operator's stress levels in a dental setup.

MATERIALS AND METHODS

A total of 170 children of 4–8 years of age requiring dental treatment (preventive, endodontic, restorative, orthodontic, and extractions) were selected after the screening process from the Outpatient Department of Pediatric and Preventive Dentistry (ITS Centre for Dental Studies and Research, Muradnagar). Prior to the study, the design was approved by the Institutional Ethical Committee. Informed consent was obtained from each subject's parents/guardians before enrolling them in the study. Patients were randomly allotted into two different groups—group I (A-V distraction) and group II (medical clown distraction).

Inclusion Criteria

Children with Frankl behavior scale 2, 3, and 4, children visiting with their parents/guardians, children having consent forms signed by parents/guardians, and children undergoing the following dental treatments preventive, restorative, extractions or endodontic.

Exclusion Criteria

Children with Frankl behavior scale 1, children not visiting with their parents/guardians, children not having consent form signed by parents/guardians. Children who came for regular checkups undergoing no treatment, children suffering from any mental/physical disability.

Parameters that were assessed:

- Modified Yale preoperative anxiety scale (MYPAS): It measured the anxiety level of a child before the procedure.⁶
- Face, legs, activity, cry, consolability (FLACC) pain scale: It assessed the level of pain experienced by a child during the procedure.⁷

- Frankl behavior rating scale: Behavior of a child was seen with the help of the Frankl scale during pre- and postoperative time periods.⁸
- Dentist stress level score from 0 to 10: Measured dentist stress on a scale of 0 (none) to 10 (high) while treating children during different dental procedures.⁹

Modified Yale Preoperative Anxiety Scale:

- Activity.
- Vocalization.
- Emotional expressivity.
- State of arousal.
- Use of parents.

Activity:

- Can not code (child not visible).
- Looking around, curious, playing with toys, reading (or other age-appropriate behavior); moves around holding area/treatment room to get toys or go to parent; may move toward OR equipment.
- Not exploring or playing; may look down, may fidget with hands or suck thumb (blanket); may sit close to parent while waiting; or play has a definite manic quality.
- Moving from toy to parent in an unfocused manner, nonactivity-derived movements; frenetic/frenzied movement or play; squirming, moving on table, pushing mask away, or clinging to a parent.
- Actively trying to get away, pushes with feet and arms, may move the whole body; in the waiting room, running around unfocused, not looking at toys or will not separate from the parent, desperate clinging.

Vocalization:

- Can not code (child not visible or can not hear audio).
- Reading (nonvocalizing appropriate to activity), asking questions, making comments, babbling, laughing, readily answering questions but may be generally quiet; child too young to talk in social situations or too engrossed in play to respond.
- Responding to adults but whispers, "baby talk," only head nodding.
- Quiet, no sounds or responses to adults.
- Whimpering, moaning, groaning, silently crying.
- Crying or screaming "no."
- Crying, screaming loudly, sustained (audible through a mask).

Emotional expressivity:

- Can not code (can not see face or child not visible).
- Manifestly happy, smiling, or concentrating on play.
- Neutral, no visible expression on the face.
- Worried (sad) too frightened, sad, worried, or tearful eyes.
- Distressed, crying, extremely upset, may have wide eyes.

State of apparent arousal:

- Can not code (child not visible).
- Alert, looks around occasionally, notices or watches what anesthesiologist does with him/her (could be relaxed).
- Withdrawn, the child sitting still and quiet may be sucking on their thumb or face turned into an adult.
- Vigilant, looking quickly all around, may startle to sounds, eyes wide, body tensed.

Table 1: Face, legs, activity, cry, consolability (FLACC) pain scale

Category	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly in a normal position	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to: distractable	Difficult to console

Table 2: Frankl behavior rating scale

Rating	Behavior	Interpretation
1	Definitely negative (- -)	Refusal of treatment, crying forcefully, fear, or any other overt evidence of extreme negativism
2	Negative (-)	Reluctant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, that is, sullen, withdrawn
3	Positive (+)	Acceptance of treatment; at times caution. Willingness to comply with dentist, at times with reservation, but patient follows the dentist's direction cooperatively
4	Definitely positive (+ +)	Good rapport with the dentist, interested in the dental procedure, laughing, and enjoying the situation

- Panicked, whimpering, may be crying or pushing others away, turns away.

Use of parents:

- Can not code (child not visible).
- Busy playing, sitting idle, or engaged in age-appropriate behavior and does not need a parent; may interact with a parent if parent initiates the interaction.
- Reach out to the parent (approach the parent and speak to the otherwise silent parent), seek and accept comfort, and lean against the parent.
- Looks to parents quietly, apparently watches actions, does not seek contact or comfort, accepts it if offered, or clings to parent.
- Keeps parent at a distance or may actively withdraw from a parent, may push parent away or desperately cling to a parent and will not let parent go.

Total score: $A/4 + B/6 + C/4 + D/4 + E/4 = 100/5$.

Face, Legs, Activity, Cry, Consolability Scale

Interpreting the Behavioral Score

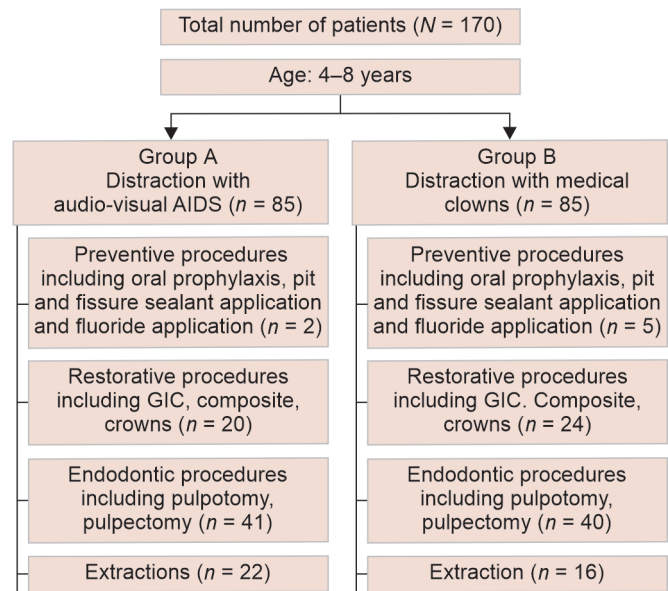
Each category is scored on the 0–2 scale, which results in a total score of 0–10 (Table 1).

0: Relaxed and comfortable; 4–6, moderate pain; 1–3: mild discomfort 7–10; severe discomfort or pain or both.

Frankl Behavior Rating Scale

- Patients were examined in the outpatient department of pediatric and preventive dentistry. Those requiring any dental treatment (preventive, endodontic, restorative, orthodontic,

Flowchart 1: Distribution of sample



and extractions) were asked to wait in the waiting area before the treatment (Table 2).

- The first examiner assessed patients in the waiting area for both groups using a modified Yale preoperative scale and Frankl behavior rating scale. Patients with Frankl ratings of 2, 3, and 4 were included in the study, and informed consent was signed by the guardian/parents.
- Patients were randomly allotted to either group to eliminate selection bias in age and dental treatment to be done (Flowchart 1).
- For group I (A-V group): Distraction was done by A-V aids to modify the behavior of a child during the procedure by the operating dentist (Fig. 1).
- For group II (medical clown group): Distraction was done by medical clowns to modify the behavior of the child during the procedure by the operating dentist (Fig. 1).
- The FLACC pain scale was used in both groups by the second examiner to evaluate the intensity of pain experienced by the child.
- The operator was asked to self-score his/her stress level on a scale of 0 (none) to 10 (high) immediately after the procedure was complete.
- Frankl's behavior rating scale was assessed again in the postoperative period for both groups individually by both examiners to eliminate bias.



Figs 1A and B: Distraction of pediatric patient undergoing dental treatment. (A) By audiovisual aid; (B) By medical clown

Table 3: Minimum, maximum, mean, and standard deviation (SD) ages of the study population

Group	Minimum	Maximum	Mean	SD
A-V group	4	8	5.92	1.40
Medical clown group	4	8	6.09	1.56
Group	Male	Female	Total	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
A-V group	61 (71.8%)	24 (28.2%)	85 (100.0%)	
Medical clown group	43 (50.6%)	42 (49.4%)	85 (100.0%)	

Statistical Analysis

All the data was collected and entered into Microsoft Excel. The statistical analysis was done using the statistical software Statistical Package for the Social Sciences (SPSS) 16.0 for Windows (SPSS Inc, Chicago, Illinois, United States of America 2001). The normality of data was tested using the Shapiro–Wilks test. The significant difference in the variables for normal data was tested using the independent *t*-test (intergroup comparison), and the paired *t*-test (intragroup comparison) was used. For asymmetric data, Mann–Whitney *U* test (intergroup comparison) and Wilcoxon test (intragroup comparison) were used.

The level of significance and confidence interval were 5 and 95%, respectively.

RESULTS

The results of the present investigation have been evaluated under the following headings:

- Age and gender-wise distribution of the sample.
- Mean comparison of MYPAS preoperative anxiety sale between A-V aids and medical clown.
- Mean comparison of FLACC intraoperative pain scale between A-V aids and medical clown.
- Mean comparison of dentists’ stress level score during treatment of the patient between A-V aids and medical clown.
- Intragroup comparison of Frankl scale in A-V group.
- Intragroup comparison of Frankl scale in medical clown group.
- Mean comparison of preoperative Frankl scale between A-V aids and medical clown.
- Mean comparison of postoperative Frankl scale between A-V aids and medical clown.

Age and Gender-wise Distribution of Sample

The sample (*N* = 170) was divided into two groups of 85 patients each. Children aged 4–8 years were selected for the study. In the A-V group, the mean age was 5.92 (4–8) years, and the mean age in the medical clown group was 6.09 (4–8) years. There was no statistically significant difference in age between the two groups (Table 3). The A-V group (*n* = 85) comprised 61 (71.8%) males and 24 (28.2%) females, whereas, in the medical clown group (*n* = 85), 43 (50.6%) were males and 42 (49.4%) were females.

Mean Comparison of Modified Yale Preoperative Anxiety Scale between A-V Aids and Medical Clown

After the random allocation of subjects in two groups, preoperative anxiety scores were measured using the MYPAS. For statistical analysis, the Mann–Whitney *U* test was performed. In the A-V group, the minimum value, which indicates the least dental anxiety in the pediatric patient, was 23.33, and the maximum value indicating high dental anxiety was 76.67, with a mean value of 49.57. on the contrary. In the medical clown group, the minimum and maximum values came out to be 25.83 and 70.83, respectively, with a mean of 9.82. The mean difference between the two groups was 1.34. There was no statistically significant difference in MYPAS preoperative anxiety scores between the groups (*p* > 0.05) (Table 4).

Mean Comparison of Face, Legs, Activity, Cry, Consolability Intraoperative Pain Scale between A-V Aids and Medical Clown

During dental treatment, the patient’s fear of pain was recorded by the FLACC pain scale. The mean values were 2.44 and 1.23 in the A-V group and the medical clown group, respectively, indicating that the pain scores were less in the medical clown group when

Table 4: Mean comparison of MYPAS between A-V aids and medical clown

Groups	Minimum	Maximum	Mean	SD	Mean difference	p-value
A-V aids	23.33	76.67	49.57	10.82	1.34	0.348 NS*
Medical clown	25.83	70.83	48.23	9.82		

Statistical analysis, Mann–Whitney *U* test; S, statistically significant at the 0.05 level; NS*, not significant ($p > 0.05$)

Table 5: Mean comparison of FLACC intraoperative pain scale between A-V aids and medical clown group

Groups	Minimum	Maximum	Mean	SD	Mean difference	p-value
A-V aids	1	9	4.78	2.44	2.96	0.000 S*
Medical clown	0	5	1.82	1.23		

Statistical analysis, Mann–Whitney *U* test; S*, statistically significant at the 0.05 level

Table 6: Mean comparison of dentists' stress level score during treatment of the patient between A-V aids and medical clown

Groups	Minimum	Maximum	Mean	SD	Mean difference	p-value
A-V aids	1	7	4.19	1.64	2.70	0.000 S*
Medical clown	0	4	1.49	0.96		

Statistical analysis, Mann–Whitney *U* test, S*, statistically significant at the 0.05 level

Table 7: (A) Intragroup comparison of Frankl scale in A-V group; (B) Intragroup comparison of Frankl scale in medical clown group; (C) Mean comparison of preoperative Frankl scale between A-V aids and medical clown; (D) Mean comparison of postoperative Frankl scale between A-V aids and medical clown

Groups		Minimum	Maximum	Mean	SD	Mean difference	p-value
A. Frankl scale in A-V	Preoperative	2	4	2.66	0.66	0.16	0.000 S
	Postoperative	2	4	2.82	0.62		
B. Frankl scale in medical clown	Preoperative	2	4	2.58	0.59	0.87	0.000 S
	Postoperative	2	4	3.45	0.55		
C. Preoperative Frankl scale	A-V group	2	4	2.66	0.66	0.08	0.501 NS
	Medical clown group	2	4	2.58	0.59		
D. Postoperative Frankl scale	A-V group	2	4	2.82	0.62	0.63	0.000 S
	Medical clown group	2	4	3.45	0.55		

compared to the A-V group. The mean difference was 2.96, and the results were statistically significant between the two groups ($p = 0.000$) (Table 5).

Mean Comparison of Dentists' Stress Level Score During Treatment of the Patient between A-V Aids and Medical Clown

After the completion of treatment, the operator was asked to self-score his/her stress level while treating the subject, ranging from 0 (none) to 10 (highest). In the A-V group, the minimum score given was 1, and the maximum value was 7, with a mean of 4.19. On the contrary, in the medical clown group, the minimum value was 0, and the maximum value was 4, resulting in a mean value of 0.96. The mean difference between the two groups was 2.70. The results were statistically significant between the groups ($p = 0.000$) (Table 6).

Intragroup Comparison of Frankl Scale in A-V Group

Frankl's behavior rating scale was used to measure the behavior of the child pre- and postoperatively. The subjects were selected for the study with Frankl behavior ratings 2, 3, and 4. In the A-V group, the mean difference between the pre- and postoperative Frankl behavior score was 0.16. The results of the intragroup comparison were statistically significant ($p < 0.05$) (Table 7).

Intragroup Comparison of Frankl Scale in Medical Clown Group

Frankl's behavior rating scale was used to measure the behavior of the child pre- and postoperatively. The subjects were selected for the study with Frankl behavior ratings 2, 3, and 4. In the medical clown group, the mean difference between pre- and postoperative Frankl behavior scores was 0.87. The results of intragroup comparison were statistically significant ($p < 0.05$) (Table 7).

Mean Comparison of Preoperative Frankl Scale between A-V Aids and Medical Clown

Inter-group comparison of the Frankl rating behavior scale showed preoperative mean values as 2.66 and 2.58 in the A-V group and medical clown group, respectively, with a mean difference of 0.08. The difference between the groups was not statistically significant ($p > 0.05$) (Table 7).

Mean Comparison of Postoperative Frankl Scale between A-V Aids and Medical Clown

Intergroup comparison of the Frankl rating behavior scale showed postoperative mean values as 2.82 and 3.45 in the A-V group and medical clown group, respectively, with a mean difference of 0.63. The difference between the groups was statistically significant ($p = 0.000$) (Table 7).

DISCUSSION

Dental fear and anxiety in children are customary, affecting dental treatment and its outcome negatively. Owing to dental fear and anxiety, children and adolescents usually fail to visit the dentist and proportionally deface their dental health. Therefore, behavior guidance is vital in pediatric practice to decrease anxiety and instill a positive dental attitude, which in turn yields quality dental treatment for infants, children, and adolescents.

"Behavior guidance is as much an art as it is a science," according to the American Academy of Pediatric Dentistry.¹⁰

Children manifest a broad range of temperaments and attitudes physically, socially, and emotionally. As a consequence, it is crucial to have a wide range of behavior guidance techniques to meet the needs of the individual child. Various nonpharmacological and pharmacological behavior modification techniques have been introduced in the past years. Distraction is the foremost key to escape the fears and anxiety of the child. Akmal and M¹¹ inferred that different audiovisual aids in the form of digital video disks or television provide a self-centered, comprehensive distraction and an effective reduction in dental anxiety as well. Likewise, Prado et al.,¹² in a systematic review, examined the efficiency of different distraction techniques like A-V distraction, biofeedback therapy, instruments camouflage, etc., and concluded that A-V aids provide total involvement of the patient screening out the sight of dental treatment, resulting in a pleasurable experience. There is no contraindication to its use, and it is widely accepted by pediatric patients in the form of three-dimensional eyeglasses, virtual reality eyeglasses, computer and TV screens, screens attached to the ceiling, and dental operating microscopes. Therefore, A-V aids have been used by practitioners and in hospitals globally with the aggregation of positive results in reducing children's anxiety and fear, which directly boosts their cooperation and enhances treatment outcomes.

Contrastingly, the unexplored field of distraction to eliminate anxiety and increase the pain threshold is **medical clowning**.

Well-articulated by Amnon Raviv, "medical clowning" is a metaphor taken from two seemingly unrelated fields, juxtaposing the medical, the scientific, and the serious with the carnival spirit, emotions, and humor.

Previously, a study by Tevatia et al.¹³ demonstrated that some dental students wore clown attire and motivated old patients, adolescents, and children to use oral hygiene measures in fieldwork. The authors stated that a medical clown (dental clown) work is psychologically intricate and complex. The clown doctor's duties expand from entertainment to humor to relieving pain and anxiety, being a part of a paramedical team. On the contrary, Sridharan and Sivaramkrishnan¹⁴ proposed a review of hospital clowns in pediatric dentistry for anxiety reduction in the future. They found that dental clowns may have a positive effect on children and the staff in the pediatric dental department, but clown-dental practice needs to be investigated.

Bennett and Lengacher¹⁵ reviewed the influence of medical clowning at the cellular level and demonstrated the biological effects of medical clowning.

Exposing patients to humor through medical clown intervention remarkably increased the Secretory immunoglobulin A (SIgA), immunoglobulin M (IgM), and immunoglobulin G (IgG) levels, which, in turn, improves immune function.

The humor responses scale in patients was directly correlated with natural killer cells (non-B, non-T, and null cells). The increase

in humor scale was directly proportional to the increase of natural killer cells, which sequentially are lymphocytes, capable of killing foreign bodies' cancerous cells and enhancing immune function.

Humor-based interaction also influences cardiovascular effects by lowering blood pressure and pulse rate.

Humor-health interaction also assists in moderating stress and anxiety and enhances social competence by releasing endorphins.

In the present study, the selected 170 patients, aged 4–8 years, were randomly divided into two groups, a group of 85 patients each, after recording a MYPAS (Fig. 2). The MYPAS scores at the baseline were not statistically significant for both the groups, eliminating the bias risk (Table 4 and Fig. 3). It showed that children in both the control and experimental groups have approximately equal dental anxiety. The pain scores evaluated by the FLACC pain scale were statistically significantly less in the medical clown group when compared to the A-V group in our study, with a mean difference of 2.96 (Table 5 and Fig. 4). Likewise, the study by Ben-Pazi et al.¹⁶ demonstrated that the clown care alleviated the pain sensation during botulinum toxic injections in children with cerebral palsy. The authors believed in clowning strategies that work on cognitive coping, guided imagination, empowerment, and emotional reflexes. Comparably, Tener et al.¹⁷ orated about the therapy beneath fun during the invasive examination of children. The medical clowning intervention was successful therapeutically, with the clown using theatrical tools to incorporate key elements such as empowerment and reframing. Therefore, we can conclude that medical clown intervention in dental settings alleviates patients' pain with the help of coping mechanisms and increases the pain threshold. It has been evident that laughter therapy releases endorphins and reduces stress, thus enhancing patient's cooperation during treatment.

Frankl's behavior rating scale was used to measure the behavior of the child pre- and postoperatively. The subjects were selected for the study with Frankl behavior ratings 2, 3, and 4. In the A-V group, the mean difference between pre- and postoperative Frankl behavior scores was 0.16, which is statistically significant (Table 7). Comparably, in the medical clown group, the mean difference between pre- and postoperative Frankl behavior scores was 0.87, which is also statistically significant (Table 7). Therefore, it can be inferred that both the methods of distraction (A-V aids or medical clown) in the dental setup led to a change in behavior scale in a more positive direction. Previously, Kocherov et al.¹⁸ observed that patients undergoing meatotomy in the presence of clowns showered with lower preoperative anxiety, required less induction time for anesthesia, and spent less time overall in the operating room.

After the completion of treatment, the operator was asked to self-score his/her stress level while treating the subject, ranging from 0 (none) to 10 (highest). In this study, the results showed that the dentist's stress level was statistically significantly at ease in the operatory with the presence of medical clowns compared to the control group, with a mean difference of 2.70 (Table 6). Homogenous to this, Efrat-Triester et al.¹⁹ explored the use of medical clowns in elevating satisfaction in pediatric and adult hospital wards among patients, parents, and staff as well. Clown doctors reduce the aggression of staff members and deliver a sense of satisfaction with gratitude.

After culminating the findings with previous evidence, it can be concluded that the intervention of medical clowns in pediatric dentistry is high-yielding and generative as a nonpharmacological behavioral approach in alleviating the children's anxiety, increasing



Figs 2: Distraction therapy for pediatric dental patients by medical clowns

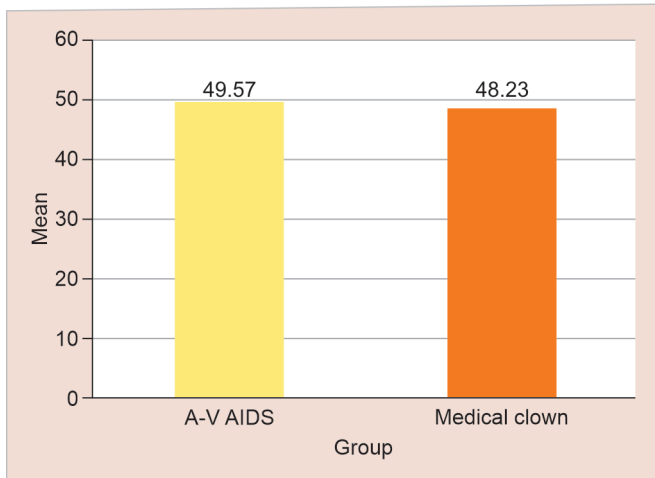


Fig. 3: Mean comparison of MYPAS between two groups

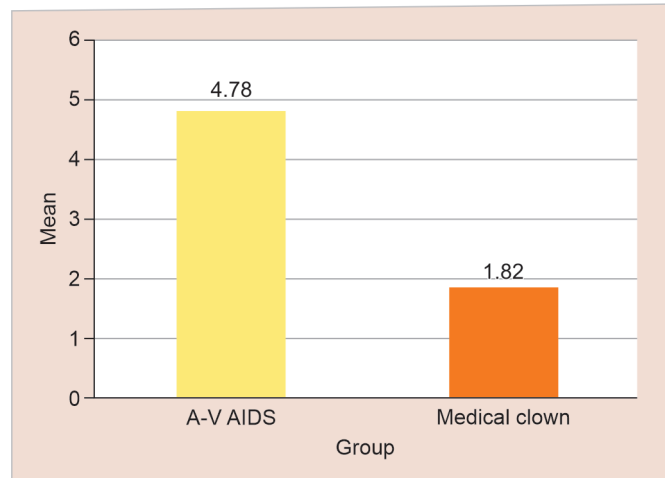


Fig. 4: Mean comparison of FLACC intraoperative pain scale between A-V aids and medical clown

the pain threshold and concurrently instills a positive atmosphere for patients, parents, and dental staff, thereby providing the best treatment outcome to the patient.

Clinical Implication

Distraction, a nonpharmacological behavior management modality, is successful in the dental operator for pediatric patients. A-V aids are one of the most acceptable techniques for behavior management in children, which have proved to reduce patients' anxiety and enhance their pain threshold, thus leading to better treatment outcomes. Exploring the new contemporary way of distraction in pediatric dentistry is the use of medical clowns. Medical clowning or hospital clown care services proved to be

serviceable and valuable as a nonpharmacological approach to behavior management in pediatric dentistry. Humor yields the power of healing, distracts pediatric patients, reduces their anxiety, and alleviates their pain, conferring the patients with a sense of laughter, creativity, and care. Not only to patients but the empathic work of medical clown also brings down the stress of the dentists while operating on the child, thus magnifying the overall treatment outcome.

SUGGESTIONS FOR FUTURE RESEARCH

Medical clown services have been in action in pediatric wards and hospitals since the 70s. The introduction of clowning in pediatric

dentistry is a breakthrough for pediatric dental patients, dental staff, and parents. This domain needs to be studied, investigated and experimented with for better evidence and reliability in the future.

Studies on the intervention of medical clowns in children with autism spectrum disorder and other special children need to be evaluated to provide veritable care to all children.

Medical clowns' role and efficiency with other nonpharmacological and pharmacological behavior management techniques (like nitrous oxide sedation) can be explored.

Why is this paper important to pediatric dentists?

- To acknowledge the importance of distraction therapy as a nonpharmacological behavior management technique in pediatric dentistry to alleviate the pain and anxiety in children and, in turn, enhance the treatment outcome.
- To explore and traverse the contemporary approach of distraction and medical clowning in the field of pediatric dentistry for yielding its positive sake in reducing anxiety not only in children but in operating dentists and parents as well.
- To recognize the biological effects supporting humor and laughter, which leads to a decrease in stress and boosts positive behavior in pediatric dental patients.

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