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Review article

Context and Management Strategies for the Dental Care of Tourette's Children

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Abstract
Tourette syndrome (TS) is a neurodevelopmental disorder that typically emerges in children between 6-8 years old. The syndrome was identified by Gilles de la Tourette in France in 1885. The syndrome refers to the combination of motor and vocal tics. TS affects individuals from all social, racial, and ethnic groups, with a prevalence of approximately 1% among school-age children. Recurrent and involuntary, non-rhythmic, sudden motor tics are the main symptom. Tics are more likely to affect boys than girls by a ratio of 1.5–4:1. It is classified as a multifaceted neurodevelopmental and neuropsychiatric disorder, believed to result from a complex interaction between social, environmental, and multiple genetic risk factors. This interaction highlights the complexity of management and points to the need for comprehensive therapeutic approaches. Maintaining routine daily oral hygiene is challenging due to this tic that affects the head, neck, shoulders, and arms, which hinders the oral hygiene process and increases the difficulty of providing dental treatment. Tourette's children suffer from consequences including tooth decay, gingival disease, grinding teeth, malocclusion, and trauma. These children often face difficulty accessing dental treatment due to multiple barriers, especially in Libya, where these patients face significant problems seeing a dentist. We zoomed in on the Tourette's children and focused on their oral health. As far as we know, this is the first article published in Libya regarding this syndrome. We share with you updated and distinctive preparatory steps to participate in supporting this group of children to get rid of pain and inflammation. This perspective article provides dental practitioners and oral health care professionals with essential insights into the context and management strategies for dealing effectively with children and adolescents affected by TS. When we have the opportunity to save a child from pain and suffering, effective symptom management is always easier than treating complications.
Keywords. *Dental Health Care Strategies, Children, Management Preparation, Tourette's Syndrome, Libya, Neurodevelopmental TS Disorder, Tics Disorder.*

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Introduction

Tourette syndrome (TS) is a neurodevelopmental disorder defined by the Diagnostic and Statistical Manual of Mental Disorders (*DSM-5*) by the presence of both motor and phonic tics prior to the age of 18 and persisting for a period of greater than 12 months without a secondary cause [1]. While it's not extremely rare, its prevalence is generally considered to be low, affecting approximately 1% of children, depending on the study. The male-to-female ratio is estimated to be 4:1, and affects individuals from all social, racial, and ethnic groups [2].

Children with TS have sudden, repeated, seemingly random involuntary twitches and movements, called tics [3,4]. Vocal/phonic sounds often appear months or years after motor tics, but they may appear first. The involuntary motor and phonic tics can be physically, emotionally, mentally, and socially painful and pose a challenge to individuals who suffer from them. The symptoms were described as being caused by uncontrollable urges or an unpleasant feeling of retention that needs to be released in the form of a tic [4]. Furthermore, the severity of tics seems to vary with age in children. Tourettic children have the most severe symptoms from ages 10-12 and less severe symptoms from 4-6 years old [5]. Tics in Tourette's children can easily be overlooked or misdiagnosed, leading to delayed or inadequate treatment [6]. In Tourette's children, the first tics to appear usually affect the head, face, and shoulders, and include blinking, facial grimacing, sniffing, and throat clearing. Among Tourette's children who experience more severe tics, complex tics may develop, including "arm straightening, touching, tapping, jumping, hopping and twirling" [7]. TS tends to be a chronic, lifelong disorder with many remissions and exacerbations, but it is generally not a degenerative disease and does not impact intelligence or life expectancy.

Diagnosis and management can be confusing when it comes to additional comorbidities that may be shaped by the cumulative effect of many genes that interact with distinct environmental determinants. These tics can be mild or moderately troublesome, or otherwise become disabling. If combined with other psychiatric morbidity, they may have a fourfold increased risk or may be associated with a variety of minor and major

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forms of self-injurious behavior, including compulsive skin picking, lip biting, clinching the teeth, head banging, self-beating, eye damage from self-poking, and even self-cutting [8-13].
Children and adolescents with Tourette's Syndrome (TS) present unique oral health challenges that dental clinicians should be aware of. The risk of oral disease in this group is multifaceted, stemming from factors such as underlying medical conditions, medication side effects, and difficulties participating in preventive oral care and treatment. Despite being eligible for Medicaid, access to dental providers can be limited, exacerbating these issues.
These oral health issues can complicate diagnosis, treatment, and management, and may also impact family dynamics, particularly if physical aggression symptoms are present. Dental clinicians who understand the distinct needs of this group can provide more effective care and support, ultimately improving the oral health and overall well-being of children and adolescents with TS [14].
Although many children with TS can be treated in a dental clinic in the same way as other children, these children face barriers to accessing dental clinics either because parents are concerned about the child's inability to cooperate or they face challenges in finding a doctor who is willing to meet their needs and can provide a child-centered approach to care and be able to prepare for the routine of multiple visits they may need [15]. Moreover, in our Libyan society, barriers may also include factors beyond the family or individual's medical condition, such as inadequate transportation, lack of awareness of the importance of preventive care, as many patients do not seek medical help for their children's tics unless they find them bothersome, and don't forget the financial barriers. The current dental care system seems to be abandoning the requirements specific to these children. However, a dentist can help provide treatment to these children to prevent oral diseases from developing or worsening.
To our knowledge, this is the first Libyan publication on this issue. We share updated, tailored steps to help support these children in accessing dental services to eliminate pain and inflammation.
Implementing strategic management steps for these children can ease the burden on the dental clinician and their team; children and their families also benefit from significant improvements in their quality of life and overall well-being. This article aims to provide systematic engagement to help this group of children and adolescents with Tourette syndrome receive dental treatment in ways that are as easy and convenient as for other children.

Causes of Tourette Syndrome (TS)

The exact cause of TS remains unknown, but research suggests a complex interplay of genetic, environmental, and neurobiological factors. Genetics plays a significant role, with an estimated 77% heritability likely involving hundreds of genes. Environmental factors, such as prenatal exposure to smoking and stressors, perinatal difficulties, lower birth weight, and bacterial infections, may contribute to TS onset and course [7,9].

Clinical Features

Generally, the tics can be sudden, rapid, recurrent, and nonrhythmic motor movements. Some tics can be minor, discrete, not severe, or overt and not readily noticeable to others. However, some complex tics such as spitting, licking, kissing, etc. (Table 1), may be misunderstood or misinterpreted and may result in the individual getting in trouble, especially if these tics include involuntary and inappropriate obscene gesturing (copropraxia) or copying the movements of other people (echopraxia). Associated behaviors can include rage, self-injurious behaviors, and socially inappropriate comments or actions. Similarly, complex vocal tics may involve repeating words or phrases (echolalia), repeating sounds (palilalia), or involuntary swearing (coprolalia). Tics are usually preceded by a premonitory sensation or urge, such as a feeling of tightness, stretch, tension, or itching that is relieved by performing the tic, thereby leading to an urge-tic relief cycle. This complex interplay between urges, tics, and relief is a hallmark of TS, and understanding these dynamics is essential for developing effective treatment approaches [8, 16-19].

Diagnosis (Dx)

The presence of motor and vocal tics that occur several times a day, every day, or intermittently for at least a year, the appearance of tics before the age of 18, and tics not caused by medications, other substances, or medical conditions are the main factors for diagnosis [20]. This is not intended to be a substitute for medical diagnosis. The healthcare provider's examination and assessment of the patient's specific and unique circumstances are important and cannot be overlooked, as it is the only way to reach an accurate diagnosis. Diagnosing tics often involves a dentist, pediatrician, or psychologist. Atypical symptoms may require specialized expertise for accurate diagnosis. In some cases, neuroimaging like MRI or CT scans, EEGs, or blood tests might be used to rule out other conditions [21].

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Table 1. Common motor and vocal symptoms of TS. (Adapted from Eapen V, Usherwood T (2021) [8]

Type of symptom	Simple (Involuntary meaningless movements)	Complex (Involuntary, seemingly purposeful movements)
Motor tic	Eye blinking, eye rolling, squinting, facial grimaces, shoulder shrugging, arm extending, mouth opening, nose twitching, lip licking, head jerks, brushing or tossing hair out of eyes.	Pulling of clothes, touching people/objects, poking/jabbing, smelling fingers/objects, punching self, jumping/skipping, kicking, hopping, walking on toes, kissing self or others, feet shuffling, flapping arms, twisting around, twirling hair, self-injurious behavior, biting, picking skin or scabs.
Vocal/phonic/ sounds	Throat clearing, grunting, snorting, yelling/screaming, sniffing, barking, laughing, coughing, spitting, squeaking, humming, whistling, and honking.	Making small animal-like sounds, unusual changes of pitch and volume of voice, stuttering, repetition of sounds.

Differential diagnosis (DDx)

Specifically, conditions with complex or atypical symptoms may require DDx to take into account comorbid conditions such as attention deficit hyperactivity disorder, disruptive behavior disorders, and anxiety.
However, Tourette's tics differ from other movement disorders, such as dancing, dystonia, dyskinesia, and spasticity, in that they are temporarily reducible, non-rhythmic, and could be anticipated by a prodromal urge [22]. It also differs from the stereotype of autism spectrum disorder that begins early in life, which is bilateral, symmetrical, and rhythmic, and mainly involves limbs such as hand flapping [23].

Epidemiology

Motor and phonic TS tics symptoms typically start to emerge around 6-7 years old, peak in severity around 10-12 years old, and often improve during adolescence. Many individuals experience a decrease in tic severity during adolescence.
According to published studies, approximately 1% of the global population is affected by tic disorders. According to various studies [24-28], the estimated prevalence of tic disorders is typically around 1% or less of school-aged children. Transient or mild tics might be more common, affecting up to 20%, but chronic tic disorders are generally less prevalent.

Tourette Syndrome and Brain Function

Several different neurotransmitter systems have been suggested to be involved in the neurobiology of TS, but the strongest evidence supports a “dopaminergic hypothesis” and, more specifically, an alteration of the tonic-phasic dopamine release system. TS is characterized by disruptions in the cortico-basal ganglia circuit, a complex network of brain regions that plays a critical role in motor control, habit formation, and sensory processing. The limbic region of the basal ganglia, particularly the ventral striatum, is believed to play a role in triggering verbal tics. Because the limbic system and its structures are involved in emotional processing, it is thought that external stressors can exacerbate abnormalities along this pathway, influencing tic output. Additional dopamine produced by the hypothalamic-pituitary-adrenal axis during stressful situations further increases the disinhibition of this system, leading to an increase in ticking behaviors [29-32].

Oral Health and Tourette Syndrome

Maintaining good oral health is crucial for individuals with Tourette's Syndrome (TS). While TS itself isn't directly linked to oral health issues, it presents unique challenges that dental clinicians should be aware of. Children and adolescents with TS face a multifaceted risk of oral disease due to underlying medical conditions, medication side effects, and difficulties with preventive oral care.
They're at a higher risk for dental problems like tooth decay, gingival issues, malocclusion, and bruxism. Involuntary movements, anxiety, and discomfort related to dental care can hinder effective oral hygiene practices. Certain medications, such as dopamine-blocking antipsychotics [14], can lead to dry mouth (xerostomia), increasing the risk of oral health issues. However, individuals with TS can learn effective oral hygiene techniques with the right approach. Their enhanced motor coordination and attention to detail can be leveraged to improve oral hygiene practices [33]. Dental professionals should adapt their approach to meet the unique needs of individuals with TS, mitigating potential oral health issues and improving overall quality of life. With the right support and strategies, individuals with TS can maintain healthy smiles and overall well-being.

Social Impact and Quality of Life

Tourette syndrome (TS) can affect various aspects of a child's life, including school performance, physical and mental well-being, and social relationships [34]. The visible nature of tics can lead to attention,

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embarrassment, teasing, or social exclusion. Children with TS may struggle to focus in class, engage in school activities, or suppress their tics, which can be misinterpreted by peers or teachers, resulting in unnecessary stress and challenges [35, 36].
Effective symptom management is crucial in preventing pain and suffering, particularly in vulnerable populations like children. Early intervention and proactive care can significantly impact their well-being and long-term outcomes.

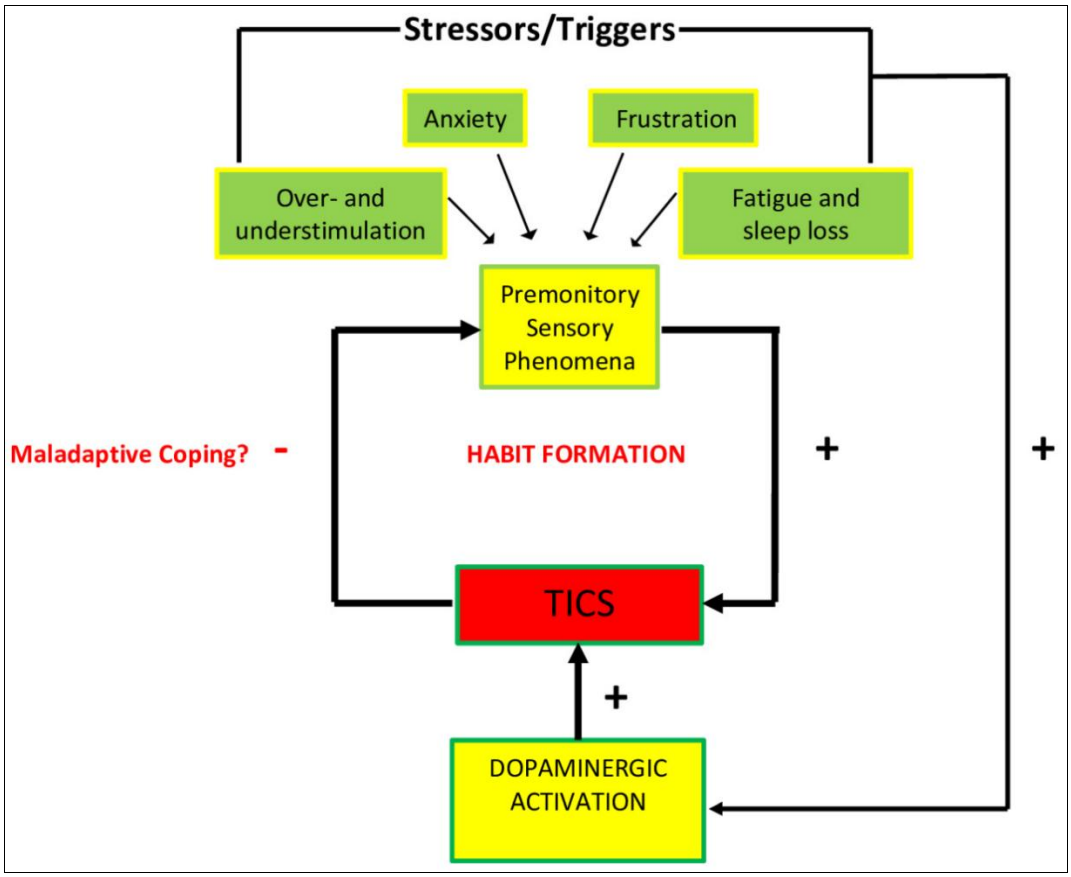

Figure 1. The association between premonitory sensations and tic behavior

Environmental and contextual triggers intensify premonitory sensory phenomena and dopaminergic activity, potentially increasing tic behavior. The tics themselves affect the intensity of premonitory sensations, creating a maladaptive habit as a coping mechanism [16].

Treatment Modalities

Tourette syndrome is not a curable disease, but because most cases are mild without any functional impairment, most patients do not need medications to relieve their tics. For those with severe symptoms and significant functional impairment, the benefit of improving their symptoms, their degree of function, and the risk of adverse effects of prescription medications must be balanced. Treatment should be tailored to the needs and goals of individual patients and their families. Children and adolescents with Tourette syndrome should receive educational information about their condition; children can be involved in behavioral exercise therapy at home to reduce the incidence and severity of nervous spasms [37].
Non-pharmacological interventions for children with mild-to-moderate tics include specific behavioral approaches techniques such as habit reversal training (HRT), exposure and response prevention (ERP), and comprehensive behavioral intervention for tics (CBIT) therapy. Also, recent treatments being explored include deep brain stimulation (DBS) of the thalamus or globus pallidus (for severe, treatment-resistant cases), Electroconvulsive therapy, and Repetitive transcranial magnetic stimulation. These therapies involve training patients to monitor their tics, respond to premonitory sensations, and engage in competing responses [38].
The Yale Global Tic Severity Scale (YGTSS) [39,40] is a valuable assessment tool for evaluating the frequency and severity of tics in individuals with Tourette Syndrome (TS). By utilizing this classification system, dentists can gain a better understanding of their patients' conditions, develop effective treatment plans, and improve patient care. This can lead to enhanced treatment outcomes and more efficient use of the dentist's time, ultimately benefiting individuals with TS.

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Figure 2. Neupulse is a wearable device that stimulates the median nerve in the wrist. Image credit: Kinneir Dufort. [41]. The median nerve is a major nerve that provides both motor and sensory functions to the forearm, wrist, and hand. The relationship between the median nerve and TS is still being studied, and more research is needed to fully understand any potential connections. The goal is for Neupulse to be available to the Tourette's community globally in the years ahead.

Dental History and Examination of Tourette's Children and Adolescents

Taking a thorough dento-medical history and performing a dental examination are crucial steps in patient care. Taking a dento-medical history and performing a dental examination include many inquiries and activities. It begins with a general survey of the patient's health. Gathering information about the patient's overall health, social and medical history, and dental health. Comprehensive history in certain cases is mandatory, and regardless of the complaint, the dentist must be aware of the great amount of useful information the history may produce. It should not be overlooked that during seeing with the patient, one is provided with a rare and valuable insight into the patient's psyche. Conducting a comprehensive examination to identify any potential issues.

Oro-facial and upper limb tics may complicate dental exams. Remember that most children with TS have normal intelligence. Indeed, the child is the most important source of information about their symptoms. So, the assessment must be seen separately, unless the parent is not permitting, or behavioral difficulty does not permit it. Through evaluating the patient's emotional state, the dentist can also gain a deeper understanding of their needs. By taking a patient-centered approach and being sensitive to the unique needs of individuals with TS, dentists can provide more effective care and build stronger relationships with their patients.

Questions to Ask

1. *How active and impulsive is the child?*
2. *Is he/she moving all over the room and getting into anything?*
3. *Does he squirm and fidget in the chair, stay immobile, or move normally in response to what is said to him?*
4. *Does the child have nervous tics or repetitive behaviors?*
    - *Is the child taking any medications or suffering from a medical condition?*
    - *When did the tics start?*
    - *How long has this problem been going on?*
    - *Are the tics persistent or intermittent?*
    - *Is there a relationship between changes in severity?*
    - *Have you noticed any causes of tics?*
5. *Are movements graceful and coordinated? (Because different degrees of activity may be appropriate at different ages, a 6-year-old and a 9-year-old may show the same activity level with very different implications).*

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These questions can help dental professionals better understand a child's behavior and adapt their approach to meet the child's unique needs. By asking these questions, dentists can develop a more comprehensive understanding of the child's needs.
~ Create a tailored treatment plan. ~ Improve communication and rapport with the child and their caregivers.
~ Provide more effective and supportive care for children with TS.

Dental Management

Dentists play a vital role in managing children with Tourette's syndrome, often serving as the first point of contact. To ensure successful treatment, dentists should adapt their approach to meet the child's unique needs, utilizing behavioral management techniques whenever possible. When planning treatment, consider the child's age, cognitive development, and tic severity. Collaboration with the child's doctor is essential to coordinate care, discuss medication, and choose suitable anesthesia. In some cases, immobilization or general anesthesia may be necessary to facilitate safe treatment, particularly for children with high anxiety or complex motor tics. By taking a tailored approach, dentists can provide a positive experience and effective care for children with TS.

Table 2. Complex interplay of variables affecting TS. Adapted from Iverson AM, Black KJ (2022) [24]

Improves Tics	Mixed Effects	Worsens Tics	Unclear Effects
Rewards for tic suppression	Stress	Fatigue Anxiety Thinking about tics	Social media
Musical performance	Distraction	Attention to tics	Some foods
Exercise	Observation by others	Social conflict	Dietary supplements

Customized Treatment Plans: A Step-by-Step Approach

When managing *TS* in children over 10 years old, it's essential to involve them in therapeutic decision-making and tailor the treatment plan to their unique needs, goals, and family values.
Here's a comprehensive approach:

1. *Interdisciplinary Collaboration:* Work with specialists, doctors, psychiatrists, psychologists, and neurologists to determine the best approach.
2. *Comprehensive Review:* Request and review relevant reports and assessments to inform treatment decisions.
3. *Flexible Treatment Planning:* Develop a plan that adapts to the child's unique experience with TS.
4. Informed Consent: Obtain approval from the legal decision-maker, ensuring they understand risks, benefits, and alternatives.
5. *Lifestyle Modifications:* Encourage stress-reducing activities, a balanced lifestyle, and realistic targets.
6. *Ongoing Monitoring:* Schedule regular appointments to assess treatment effectiveness and make adjustments.
7. *Patient-Centered Approach:* Foster open communication, incorporating patient feedback into treatment decisions.

Table 3. Oral Health Issues May Be Found in Tourette's Individuals

Health problems	Exhibit feature
Oral habits	Traumatic ulcers, gingival recession Tongue thrusting and lip biting
Bruxism	Tooth wear and tooth sensitivity, jaw pain, and headaches
Temporomandibular joint (TMJ) disorders	Strain on the TMJ, leading to pain, clicking, and locking of the jaw
Dental caries	Bad oral hygiene, multiple cavities, increased risk of dental caries
Gingival diseases	Poor oral hygiene, gingival bleeding
Malocclusion	Premature tooth contact, openbite, crossbite Increased overjet and overbite
Anxiety and phobia	Difficulty in receiving dental treatment
Oral tics	Trouble with swallowing, chewing, and speaking

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Utilizing Behavioral Psychology in Dental Management: A Tailored Approach

While not a cure, behavioral psychology can significantly impact managing and modifying tic habits in individuals with TS. A tailored behavioral approach can help reduce tic frequency and severity. Various methods (Table 4) can motivate individuals, increase adherence, and promote positive outcomes. Consulting a qualified healthcare professional is essential for personalized guidance. Additionally, internet-based and telehealth approaches can increase access to behavioral therapies [15]. Emerging nonpharmacological therapies, such as autonomic symptom conversion or attention-based interventions, may also show promise in treating TS in children [42].

Table 4. Behavioral methods might be used to relieve and relax to suppress tics

Positive Reinforcement	Uses rewards for timely completion, gift incentives for tasks, encouragement of positive behavior, and reinforcement of desired actions
Negative Reinforcement	Removes or reduces distractions, such as turning off electronic devices, can promote focus and improve concentration by reducing stimuli
Modeling	learning effective coping strategies by observing others handle difficult situations can promote positive behavior
Planned neglect	By pretending not to see or hear motor spasms and not drawing attention to them, the child easily gains another platform to release the urge
Education	Educating patients about treatment steps fosters trust, promotes open communication, and builds conflict-resolution skills
Motivation	Using incentives or rewards, or providing a bonus for achieving dental visit goals
Guidance	By providing clear instructions and support, children can better understand expectations and feel more confident
Collaboration	Working together towards treatment goals, collaboration fosters, strengthens relationships, and enhances problem-solving
Environmental Control	A well-managed environment enables dentists to enhance patient comfort, optimize treatment outcomes, and boost patient satisfaction, ultimately leading to more effective care
Extinction	This involves ignoring or not reacting to the tic, which can help decrease its occurrence over time. Consistency is key in this approach
Habit reversal training	This technique involves becoming aware of the tic and replacing it with a competing response, like relaxation or a gentle movement
Cognitive-behavioral therapy (CBT)	By providing structured, goal-oriented therapy that focuses on the main problems, dentists can help Tourettes to control their tic-urge and help them acquire coping skills

Providing sensory stress balls in dental clinics can be a thoughtful touch! It can:

~ Reduce anxiety and stress.
~ Create a calming atmosphere.
~ Offer a comforting distraction.
~ Enhance patient comfort and experience.

This simple addition can make a big difference in creating a supportive environment for patients, especially those with Tourette's syndrome or other sensory needs.

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Figure 2. During dental treatment, stress balls can help patients manage anxiety, focus away from discomfort, and feel more at ease. This can lead to a more positive dental experience

Key Points

1. Establish a good rapport with the parent and the child to build trust and confidence.
2. Schedule pre-procedure consultations with the patient's physician and anesthesiologist to discuss plans, medication regimens, and concerns.
3. Prepare "plan B" to control anxiety and stress during the procedure, such as relaxation chatter, time leeway, or pharmacological techniques.
4. Discuss with your team ways to reduce tic triggers during the procedure.
5. Ensure the dental team is aware of the patient's disorder and potential interactions.
6. Talk to the parents and child about preparing for the next visit.
7. Advise the parent/child to visit internet sites like: https://www.tourettes-action.org.uk/storage/downloads/1374586633_Tic-tips---managing-your-TS.pdf

OR https://www.ninds.nih.gov/health-information/disorders/tourette-syndrome

OR https://www.facebook.com/p/Association-Tunisienne-du-syndrome-Gilles-de-la-Tourette-100088603927326/?_rdr

Preparing a Touretted Child for Dental Treatment

Before Treatment

1. Explain the treatment process. Use simple, clear language to explain what will happen during treatment.
2. Encourage the child to express their concerns and questions, and provide reassurance and answers.
3. Introduce the child to the staff, and encourage him to ask questions and feel comfortable with the team.
4. Help the child develop a plan to manage anxiety or stress related to treatment, such as deep breathing or visualization techniques.
5. Create a calm and Tic-friendly environment to help reduce stress and tic frequency.
6. Enable the child to acquire the personalized knowledge and skills necessary to maintain good oral hygiene.

On the Day of Treatment

1. *Provide emotional support:* Ensure the child has a trusted adult with them for emotional support.
2. Reassure the child and his parents that they are there on time, in the right place, and with reliable staff.
3. Addressing parental anxiety is an important aspect of providing comprehensive care for children.
4. *Use positive reinforcement:* Praise the child for their bravery and cooperation during treatment.
5. *Minimize wait times:* Try to minimize wait times to reduce anxiety and stress.

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6. *Offer comfort items:* Allow the child to bring a comfort item, such as a favorite toy or electronic device, stress ball, or fidget toy, to provide reassurance.

During Treatment

1. Use distraction techniques, such as watching a movie or listening to music, to help the child relax during treatment.
2. Keep the child informed about what is happening during treatment.
3. Use positive words to encourage the child's cooperation.
4. Monitor the child for signs of anxiety or stress, and adjust the treatment plan as needed.
5. Save the extra time and effort needed to better support the child, helping them feel at ease and relaxed.

After Treatment

1. Praise the child for their bravery and cooperation during treatment, and consider offering a reward for their efforts.
2. Continue to provide emotional support and reassurance after treatment.
3. Monitor the child for any side effects or reactions to treatment.
4. Make a follow-up schedule based on parents' approval and consent, child's comfort level and readiness, and treatment plan and progress.

Dentist Preparation for Management of Tourette's

Pre-Treatment

1. Ensure that the diagnosis made is accurate and based on the main chief complaint and dental history.
2. Evaluate the child's behavior and the type and severity of the tic. If a child has a referral letter from their psychiatrist or neurologist, the tic severity and frequency score estimated by *the Yale Global Tic Severity Scale (YGTSS)* is paradoxically included, which should be considered during preparation.
3. Identify comorbid conditions such as *ADHD*, obsessive-compulsive disorder, or anxiety disorders.
4. Be aware of prescription medications such as antipsychotics, alpha-2 adrenergic agonists, or other medications to avoid complications.
5. Create a treatment plan based on the child's specific needs and circumstances.

During Treatment

1. Assess the child's general appraisal.
2. Employ the tell-show-do approach.
3. It is advisable to have the parent in the dental operatory as he or she is well acquainted with the behaviors of the child.
4. Manage the onset of tics through the use of behavioral techniques.
5. Encourage regular stress management and relaxation techniques throughout the session.
6. Remember that using rubber dams can be a useful tool in restorative procedures, and fitting bite blocks properly increases children's comfort and cooperation.
7. Regular monitoring is essential for evaluating the effectiveness of treatment and making necessary adjustments to the treatment plan.
8. The patient's head should be supported to prevent involuntary movements from interfering with the ongoing procedure throughout all steps of treatment.
9. Efficient dental sessions can help minimize patient fatigue that decreases tics and their severity.

After Treatment

1. Regular check-ups according to the child's condition to adjust treatment plans.
2. To maintain treatment gains, it is important to encourage the child to brush his teeth and maintain oral hygiene habits.
3. Ensure that the child and parents receive ongoing support, education, resources, and guidance to manage habits and tics.

Discussion

This article is the first to explore Tourette's Syndrome (TS) among Libyan children, shedding light on the broader implications of tic disorders on dental health. However, TS diagnosis can be delayed due to limited awareness among healthcare providers, who may initially attribute symptoms to other causes or developmental phases. The lack of education and understanding about TS poses significant challenges for affected children and their families.

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Studies in several Arab countries have reported prevalence rates consistent with global findings [43], ranging from 0.4% to 3% among school students [44-46]. Notably, children with TS are often highly intelligent and capable learners, capable of succeeding academically and socially [47,48].
TS is characterized by a combination of motor and vocal tics, which can vary in type, frequency, and severity [49]. Many of the orofacial tics and compulsive behaviors seen in this disorder may cause destructive oral lesions. The medications used in treating the syndrome may adversely interact with dental therapeutic agents, frequently cause hyposalivation associated with the development of dental caries and periodontal disease, and may produce tardive dyskinesia with buccolingual choreiform movements [50]. Dentists, particularly those with specialized training, can play a crucial role in identifying tics and referring children for evaluation. While the exact pathophysiology of tics remains unclear, research suggests that symptoms can change over time, influenced by various factors [51,52].
In some cases, TS can persist into adulthood, potentially leading to chronic tics and increased risk of metabolic and cardiovascular disorders [53]. Further awareness and education are essential to support individuals with TS and their families.

Conclusion

Supporting children and adolescents with Tourette's syndrome requires a collaborative effort from oral health professionals, parents, educators, and others. By promoting awareness, guidance, advocacy, and education, we can empower individuals and families affected by TS to reach their full potential. Addressing misdiagnosis and misconceptions is crucial, and educational institutions can play a key role by enhancing staff training and implementing targeted support programs. Ultimately, raising awareness, motivating research, and providing necessary support can make a significant difference in the lives of those affected by TS. We argue that educational institutions must enhance their staff training plans to promote coordination between them and implement more targeted and effective programs to support the unique needs of children with Tourette's.

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