We have an enormous influence on children’s overall health

By Dental Tribune International

Parents of children with systemic disease often wonder in the dentist’s office what oral health problems they can expect for their child. Depending on the type of systemic disease, there can be complications in terms of the child’s oral health. In this context, Dr Karolin Höfer, senior physician at the University Hospital of Cologne, studies oral disease in children with chronic renal insufficiency or congenital heart defects. In her oral health interview, she spoke about the typical oral health problems of paediatric kidney and heart patients based on her own research and compared these with current systematic reviews. She then, in a very personal interview gave helpful suggestions for the support and treatment of these children in everyday life.

Dr Höfer, why do you like working with children?

Dr Karolin Höfer: My passion lies in working with children and young people; that’s why I specialised in paediatric dentistry with a special focus on children with systemic disease. In dentistry, we say: one either loves it or leaves it.

With every one of my young patients, whether they have a medical history or are healthy, I have to gain their confidence on an emotional level first, aside from the dentistry challenge. Working with children whose health status and treatment histories in particular require sensitive handling in order to build trust, which is the foundation of successful treatment. Intuition, taking sufficient time, patience and empathy are essential here.

Successful treatment of children with cancer or severe heart problems or others at high risk is achievable by using special techniques, such as ritualised behaviour management. After a difficult treatment, having a child smile and ask when he or she can come back is the best endorsement in daily practice.

What patients do you work with?

Most of my patients have a systemic disease and are with me from birth up to age 25. The period between ages 18 and 25 is considered a transition phase from child to adult. After careful paediatric treatment, a deterioration of the condition is frequently reported during the transition phase. For example, we treat patients with cystic fibrosis, congenital heart defects, chronic kidney disease and immunosuppression, for example, after a transplant or during cancer treatment. Every day, we ask ourselves: Are there correlations between these systemic diseases and oral disease and/or disease that affects tooth development? As dentists, we should know how these systemic disease can affect oral health. We are already aware of the well-known interactions with some chronic diseases, such as congenital heart disease, diabetes mellitus, arthritis and chronic diseases of the bowel and kidney.

What questions do dentists have to ask when treating these patients? First of all, it is important to identify the child’s dental problem. Secondly, it should be determined whether the child has certain diseases and whether there are interactions with oral disease. And thirdly, which specialists in other disciplines should be consulted before dental work commences must be established.

How do you see your position as a dentist within the holistic therapy of these children?

I am not responsible for the patient’s entire medical recovery. However, I see myself as a physician, mediator and member of a team of paediatric specialists. When we treat patients with systemic disease, we need to be in contact with specialists from all disciplines. As experts in oral health, we have an enormous influence on children’s overall health.

Dr Höfer, what do you work with children who have systemic disease? In dentistry, we say: one either loves it or leaves it.

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I am not responsible for the patient’s entire medical recovery. However, I see myself as a physician, mediator and member of a team of paediatric specialists. When we treat patients with systemic disease, we need to be in contact with specialists from all disciplines. As experts in oral health, we have an enormous influence on children’s overall health. Every dentist should consult with the treating paediatricians of children with pre-existing conditions. It’s about the overall well-being of the child. Even a tooth cleaning can take on another meaning for these children. Healthy people associate it with health, well-being and aesthetics. For children with systemic disease, however, an intensive prophylaxis can have major implications for their general health, for example, should pathogenic bacteria enter the bloodstream of a child, say, with immunosuppression.

You work with children who have congenital disease. You have conducted interesting studies on the prevalence of caries and gingivitis. What is your result?

If one considers the tooth decay process of healthy children in Germany 20 years ago, about five teeth were affected by tooth decay, while today, only one tooth on average is affected. Up to 85 per cent of 3-year-olds have no caries, however, the remainder may have up to 10 carious teeth. As I said, these figures involve healthy children.

For children with systemic disease, the situation is different. Children with heart disease have a demonstrably higher prevalence of caries. On average, four to seven teeth are affected. Children with kidney disease have a risk of caries comparable to that of healthy children; however, this group presents a much higher risk of developing gingivitis. Gingivitis could thus be understood as enabling bacteria to enter the bloodstream. Children with cystic fibrosis also have a very low caries prevalence, but owing to the frequent intake of antibiotics, the composition of their saliva is altered, so in this patient group, frequent enamel hypoplasia has been determined.

Why should paediatric dentistry be interested in such interactions?

If there are potentially about 700 different species of bacteria in the mouth, and children with heart disease have an increased risk of caries, the danger actually exists that these bacteria will reach the bloodstream via the mouth. We are speaking here of bacteraemia. Bacteraemia is not a disease in itself and is not a risk for a healthy patient, the immune system automatically fights the invading bacteria. For patients with systemic disease, the starting point is different. It is therefore not surprising that, with bacteraemia, oral streptococci, in particular the viridans streptococci, can be detected. Blood cultures reveal, for example, that viridans streptococci, as part of the oral cavity, are also responsible for 50 per cent of infectious endocarditis cases. Of course, bacteraemia does not automatically lead to endocarditis. As I said, a healthy body can normally deal with such bacteria. Patients with pre-existing conditions like heart disease, however, have a higher risk of endocarditis. Ideally, children with a serious heart disease should have their teeth cleaned prior to upcoming heart surgery.

How frequently does bacteraemia develop after dental procedures?

Occult bacteraemia can result from routine activities such as toothbrushing, but of course also through different dental procedures. Bacteraemia develops most frequently after surgeries like tooth extractions. Here, the frequency is usually about 100 per cent. These bacteria can be released during periodontal procedures, such as scaling and root planing, and even during professional tooth cleaning, bacteria enter the bloodstream in around 40 per cent of patients. It is very interesting that, even after brushing and interdental care, the frequency of bacteraemia is about 68 per cent. As I said, a healthy body normally deals with such bacteria, but the picture is different for patients with systemic disease, particu-
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Dr Karolin Höfer, Germany

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This genetic defect and a patient’s dental status?

Patients with cystic fibrosis often have an accumulation of viruses, fungi and bacteria in their airways, which can in turn lead to pneumonia. These patients are under constant drug therapy. As dentists, we should comply with special hygiene regulations. We should be aware that the particulate matter that normally develops during dental treatment is to be avoided. One danger, for example, is lung infections, which can be triggered by bacteria like Pseudomonas aeruginosa. This risk can be prevented by using an external water supply.

What measures do you recommend to reduce the risk of bacteraemia for these risk groups?

We are currently conducting an intervention study in collaboration with the paediatric nephrology division at the University of Cologne. In addition to treating gingivitis through intensive prophylaxis, the goal of the clinical trial is to determine the bacterial risk after toothbrushing. For bacteria identification, blood cultures and oral microbiomes are examined. We want to examine the influence of a patient-centred intensive prophylaxis programme and improved oral hygiene on the change in the oral microbiome. We hope in the long term to improve oral hygiene through regular check-ups and instructions, and to implement an interdisciplinary prevention programme for children with chronic kidney disease.

Furthermore, we hope to achieve a substantial improvement in oral health with targeted tooth cleaning and intensive prophylaxis, and to eliminate the daily bacteraemia risk in children at risk, as well as carious lesions and gingivitis. This includes a regular recall system for these high-risk patients adapted to their individual needs.

What are your recommendations for parents?

I would like children to look forward to their dental appointment with me. Through a very intensive relationship with the children and their relatives, I replace the cliché of an uncomfortable and angst-ridden dental visit with trust in dental treatment. We should give today’s generation of children a new perception about dentists. Of course, for many parents who have a child with a systemic disease, oral hygiene is not their top priority. However, all the results of my clinical trials to date have shown that oral health has only a positive effect on the overall health of children with systemic disease, but besides that, the quality of life and self-confidence of my young patients are enormously strengthened.

What is your appeal to your peers in practice?

It is enormously important to take children in dental treatment in hand, accompany, explain and find a way to bring dentistry goals in line with the systemic disease.

We must achieve oral health in children as quickly as possible and maintain it for the long term through individual prevention programmes. The treatment of children with systemic disease should always take place in consultation with the treating paediatrician. Every practice staff member should contribute to paediatric dentistry being perceived by parents as a specialist field in interdisciplinary cooperation with paediatricians and serving the well-being of their children.
Combination of breast milk and babies’ saliva shapes healthy oral microbiome, study suggests

By Dental Tribune International

SÃO PAULO, Brazil: In a discovery that may help the early identification of oral squamous cell carcinoma (OSCC), researchers in Brazil have found a correlation between the cancer’s progression and the abundance of specific proteins present in tumor tissue and saliva. The discovery offers parameters for predicting the progression of the disease and may help in overcoming the limitations of clinical and imaging exams.

“We worked on the study for five years until we achieved this breakthrough,” said contributing author Adriana Franco Paes Leme, a researcher at the Brazilian National Bioscience Laboratory—part of National Energy and Materials Research Center (CNPEM) in São Paulo.

During the first phase of the study, researchers used laser microdissection and proteomics to map the proteins in mouth cancer tissue and correlate them with the clinical characteristics of the patients. This analysis enabled the identification of several proteins, such as CST1, NDRG1, LTA4H, PCGPs, COLE1A, ITGA6 and MB—with differing levels of abundance depending on the tumor area—and link them to key clinical outcomes.

After identifying and quantifying proteins in about 120 tumor tissue samples, the second phase of the study saw researchers deploy two protein verification strategies. “One strategy consisted of gauging the abundance of the selected proteins in independent tissue samples using immunohistochemistry with antibodies. The other consisted of monitoring the same preselected targets in patients’ saliva,” explained Paes Leme.

“Saliva is a promising source of markers, as well as being a fluid obtained by noninvasive collection,” she explained. “We verified the proteins in saliva from 40 patients. Technical triplicates were analysed to achieve the highest possible confidence level for the results in this phase of the study.”

After analysing the saliva samples, researchers used bio-informatics and machine learning techniques to obtain prognostic signatures. From here, they were able to verify which of the proteins or peptides were selected during the first phase and could thereby distinguish between patients who had or did not have cervical lymph node metastasis.

According to the study’s results, it was possible to identify three specific peptides—LTA4H, COL6A1 and CST1—that can be used as a signature to classify patients with and without cervical lymph node metastasis. Researchers believe that this could potentially help doctors overcome the limitations of clinical exams and guide personalized treatment strategies.

“The data led to robust results that are highly promising as guides to defining the severity of the disease. We suggested potential markers of the disease in the first phase of the study and verified these markers in the second phase, enhancing the reliability of the findings and showing that these markers are effective in classifying patients with cervical lymph node metastasis,” said Paes Leme.

Scientists are now working on a new study designed to use translational techniques to build affordable biosensors that are capable of detecting prognostic signatures in patients’ saliva.

The study, titled “Combining discovery and targeted proteomics reveals a prognostic signature in oral cancer,” was published online in September 5 in Nature Communications.

Partners of the study included the São Paulo State Cancer Institute, the University of Campinas, Piracicaba Dental School and Institute of Computing, the University of São Paulo’s Mathematics and Computer Science Institute in São Carlos, the Dental School of the West Paraná University, as well as other institutions in and outside of Brazil. It was funded by the São Paulo Research Foundation, with the research conducted at the National Energy and Materials Research Centre.
Dental Hygienist Seminar Impressions
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