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Periodontal disease in a Rubinstein–Taybi syndrome patient: case report

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Summary. *Introduction.* Rubinstein–Taybi syndrome (RTS) is a rare disorder affecting 1 of 300,000 people, characterized by growth, mental and motor retardation, small stature, broad thumbs and toes, characteristic face, high-arched palate, and recurrent respiratory infections.
Case report. The present report describes the periodontal and immunological status of a 14-year-old female patient with RTS. Probing depth, clinical attachment level, bleeding on probing, and radiographic evaluation were performed. Periodontal examination revealed severe attachment loss in incisors and molars and generalized bleeding on probing. Periodontal treatment consisted of scaling and root planing and oral hygiene instructions. Periodontal treatment resulted in resolution of gingival inflammation and pocket depth reductions. The association of periodontal disease and RTS is previously undescribed.
Conclusion. This case report underscores the importance of periodontal clinical diagnosis and the possibility of successful periodontal treatment in RTS patients.

Introduction

Rubinstein–Taybi syndrome (RTS; OMIM 180849) was initially described in 1957 by Michail *et al*. as a case report [1]. In 1963, Rubinstein and Taybi reported seven cases with a constellation of congenital abnormalities consisting of short, broad thumbs and great toes, psychomotor retardation, highly arched palates, and histories of recurrent respiratory infections and particular facial abnormalities [2], which characterized the broad thumb–hallux syndrome, afterwards called Rubinstein–Taybi syndrome [3,4].

The incidence of the syndrome has been estimated to be 1 in every 300,000 newborns [5,6]. Reports of more than 1000 patients have been published worldwide [5]. There is an equal male and female incidence [3,5,7].

Most of the cases are caused by spontaneous mutations or translocations affecting the short arm of chromosome 16, more specifically involving the locus 16p 13·3 [3,4,8]. Familiar cases, however, have been reported, suggesting autosomal dominant inheritance with variable penetrance [7,9]. The RTS can be caused by microdeletion and mutations of the gene for regulation of cAMP [4,9].

The diagnosis is made mainly by clinical and radiological examination, as there are no chromosomal or biochemical markers for the syndrome. In most cases, the diagnosis is established on the basis of the following major criteria: broad, short-terminal phalanges of the thumbs and great toes, the characteristic facial appearance, short stature, and motor and mental retardation [5].

The facial abnormalities are important factors in diagnosis and include: slant of palpebral fissures, prominent forehead, hypertelorism, microcephaly, low-set ears, a beaked nose, long eyelashes, and partial ptosis [2,3,10]. Eye anomalies most frequently reported are: lacrimal duct obstruction, glaucoma, congenital catarata, coloboma, strabismus, refractive errors, and corneal abnormalities [2,5,8,11]. Common skeletal anomalies include skeletal maturation retardation, dysplastic ribs, spina bifida occulta, scoliosis, large foramen magnum, and vertebral and esternal anomalies [2,5].

Congenital anomalies of cardiovascular system are also described such as septal defect, patent ductus

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arteriosus, coarctation and stenosis of the aorta, and pulmonic stenosis [3,5,11,12]. Bilateral renal duplication, renal agenesis, vesicoureteral reflux, urinary tract infection, retrovaginal urethra, renal tubular acidosis, and duplicated collecting system are some renal alterations associated with RTS [11,12]. Tumors like medulloblastoma, neuroblastoma, meningioma, hamartoma, and haemangioma can be seen, as well as cutaneous features like spontaneous keloids, nevus, *café au lait* spots, keratoses pilaris, and hypertrichosis [3,11,13,14].

Oral anomalies frequently seen in patients with RTS are thin upper lip, small opening of mouth, pouting lower lip, poor lip mobility, mandibular prognathism, retro/micrognathia, appearance of highly arched, narrow palate, bifid uvula, palatoschisis, bifid tongue, poor lingual mobility, short tongue frenulum, marked median groove in tongue, malpositioned or crowded teeth, high caries prevalence, discolored teeth, large teeth, and talon cusps of the incisors [15–20].

Recurrent respiratory tract infection occurred in 52–78% of the patients and it has been assumed to be secondary to microaspiration as a result of gastroesophageal reflux [2]. Some reports, however, have described defective T cells and phagocyte immunodeficiency as a characteristic of the RTS [21]. Rivas *et al*. [22] have related low phagocytic index, unresponsiveness to delayed hypersensivity tests, mainly streptokinase–streptodornase and low percentage of rosette-forming lymphocytes, strongly suggestive of a cell-mediated immunodeficiency. Kimura *et al*. [23] have described hypoplasia of the thymus in autopsy of the patients with RTS. Villella *et al*. [6], studying one patient with RTS and recurrent infections, have observed low levels of IgM and an increased level of IgA. IgG subclasses were quantitatively normal but the patient failed to respond to Pneumovax. Antibody responses to tetanus and diphtheria were normal. They concluded that abnormalities of such T- and B-cell interactions may be responsible for the impaired immune response found in their patient. Because of these alterations, an early diagnosis of immunological deficits and institution of the adequate treatment may improve the quality of life of these patients.

Case report

A 14-year-old female with RTS, the youngest of a two-child family, was referred to the Periodontal Clinic at the University of São Paulo, Brazil for a periodontal evaluation.

The patient's history contained the following findings: recurrent ear infections and recurrent pneumonia until the age of 8. The patient started walking at 7 years old. There was no familial history of abnormalities and no history of parental consanguinity.

The following clinical extra-oral findings were observed: short stature with broad thumbs, mental retardation, down-slant of the palpebral fissures, epicanthic folds, ptosis, strabismus, and simple ear (Fig. 1). The nose has a beaked appearance, broad fleshy bridge, deviated septum, and short low columella (Fig. 2). Intra-oral findings were high-arched palate, a small mouth, and malocclusion, but talon cusps could not be observed. A panoramic radiograph revealed a supernumerary second premolar in the mandibular left quadrant. Heavy calculus and plaque deposition could be noted on all teeth. The marginal gingiva was severely inflamed and probing resulted in gingival bleeding. Pocket depths ranged from 4 to 6 mm and attachment loss ranged from 6 to 7 mm (Fig. 3). Mobility grade 3 was present at teeth 24 and 25. Radiographs revealed periodontal breakdown around molars and incisors (Figs 4 and 5). The lower central incisors had lost more than 70% of their supporting alveolar bone.

Haematological examination revealed the following parameters: immunoglobulin A 165 mg/dL, immunoglobulin G 1370 mg/dL, immunoglobulin M 1490 mg/dL (high levels), lymphocytes count 2808 cell/μL (CD41133 cell/μL and CD8772 cell/μL). White blood cells count was normal (11,700/mm^3), being neutrophils 7839/mm^3, basophils 117/mm^3, eosinophils 234/mm^3, lymphocytes 2808/mm^3, and

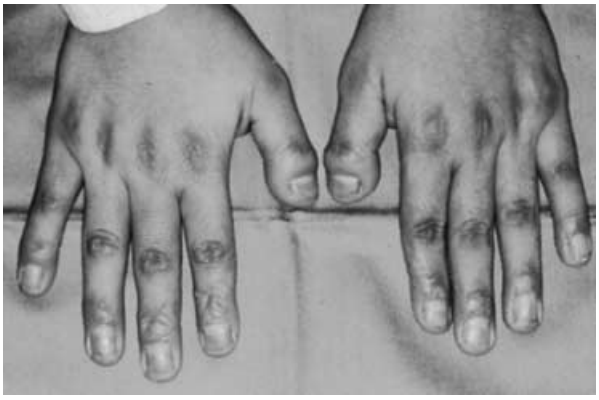

Fig. 1. Broad thumbs are important characteristics of Rubinstein–Taybi syndrome.

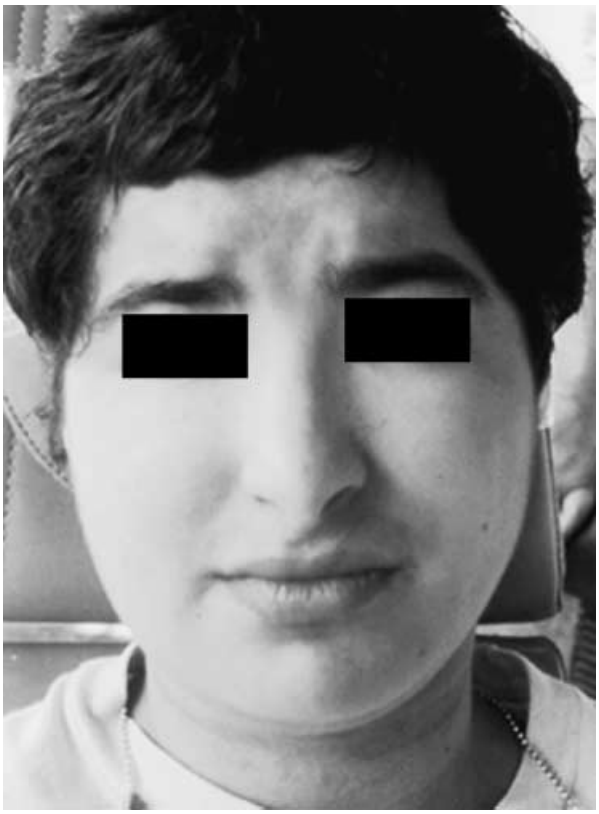

Fig. 2. Facial characteristics include slanting palpebral fissures and beaked nose with nasal septum extending below the alae.

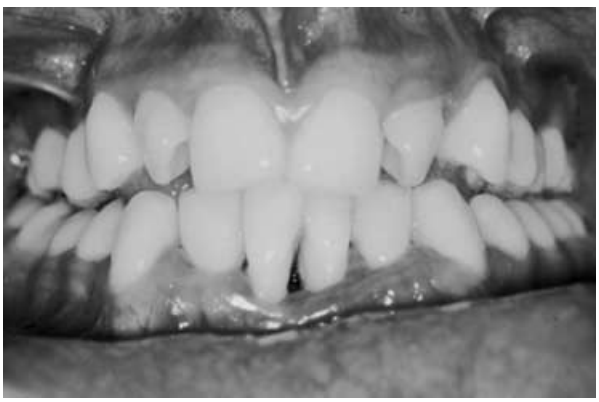

Fig. 3. Clinical aspect before periodontal treatment. Molars and incisors presented severe gingival inflammation, mobility and attachment loss ranging from 6 to 7 mm.

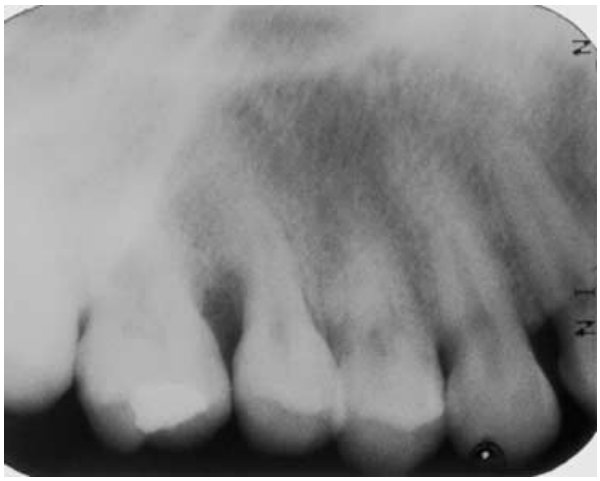

Fig. 4. Radiographs of molars and incisors revealed moderate to severe bone loss.

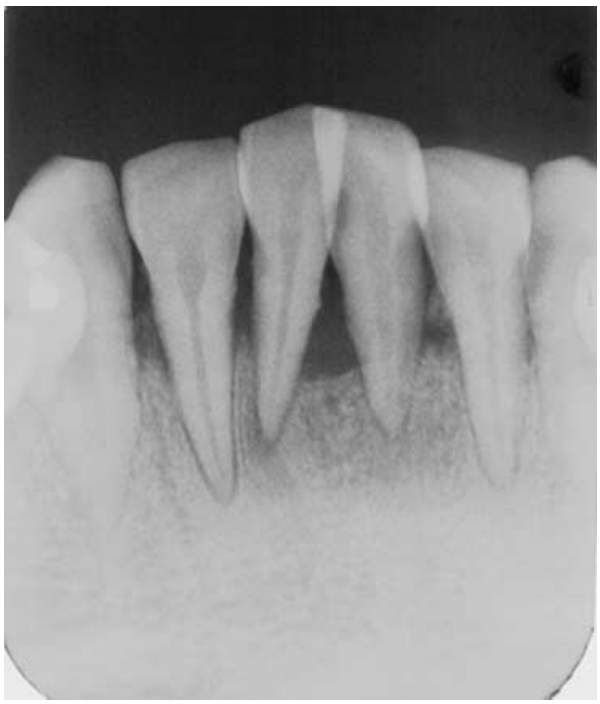

Fig. 5. Radiographs of molars and incisors revealed moderate to severe bone loss.

monocytes 702/mm^3. Platelets were normal (148,000/mm^3), and haematocrit was 39%. The response to tetanus toxoid was normal (0·165 UI/mL).

Periodontal treatment was performed at the clinics under local anaesthesia, as the patient was very collaborative. Detailed oral hygiene instructions were given to her grandmother, who provided routine care for the patient. Periodontal treatment consisted of thorough scaling and root planing in the whole dentition. Revaluation was performed 1 month after completion of the treatment. The supervised oral hygiene regimen resulted in the establishment and maintenance of low plaque index scores. The pocket depths were markedly reduced, with no measure-

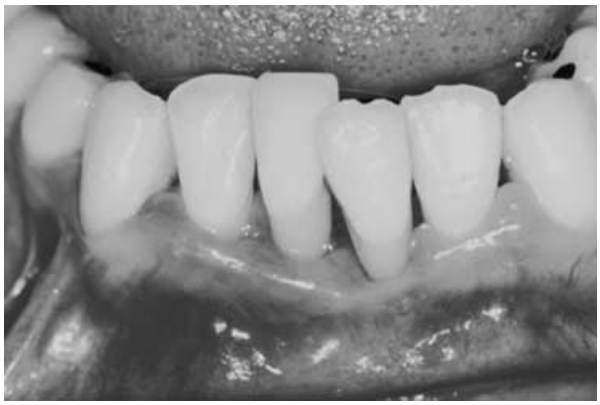

Fig. 6. After periodontal treatment, there was a recession of gingival margin and a decrease in pocket depths.

ments greater than 3 mm and recession of the gingival margin could be noted in several regions of the dentition (Fig. 6). The mobility of teeth 24 and 25 was no longer clinically evident.

Discussion

In 1963, Rubinstein and Taybi described a rare medical disorder that may be resulted from a deletion of chromosomal material at 16p13·3 [5]. More than 200 reports of RTS have appeared in the literature since then. The oral findings of RTS are well documented in the literature [17–20]. Periodontal disease, however, has never been associated with RTS.

A case of aggressive periodontitis in a Rubinstein–Taybi syndrome patient and the periodontal treatment performed have been presented. It is important to consider that the patient described in this report presented both motor and mental retardation that impaired significantly oral hygiene procedures. As a matter of fact, her grandmother brushed her teeth twice a day. At the beginning of the treatment, the plaque index was high (90%), but after oral hygiene instructions, approximately 30% of the dental surfaces presented plaque. Clinically, the patient presented the features of localized aggressive periodontitis with moderate to severe loss of attachment involving molars and incisors. The periodontal treatment was performed successfully and no periodontal surgery was required. The periodontal breakdown presented by the patient may be a result of the combination of poor plaque control and some immunological deficiency, although the presence of periodontitis in this patient as a casual finding may also be considered.

The patient described here was 14 years old, whereas the majority of case reports present the oral characteristics of younger patients, most of them children less than 10 years old. Periodontal disease may be associated with RTS at older ages and the observation of older patients may be helpful to clarify such hypothesis. Most of patients described in the literature presented recurrent ear and upper respiratory tract infections at early ages. This kind of problem is also usually observed in children with abnormal phagocytic response, in who periodontal damage is also frequently present [24]. Some reports have identified the presence of an impaired immune response in patients with RTS [6,23] and maybe this condition can be a risk factor to the establishment and development of periodontal disease. The patient presented normal haematological parameters with the exception of IgM that is increased, although the qualitative analysis of the immunoglobulin and neutrophils was not performed. High levels of IgM are in contrary to the findings of Vilela *et al*. [6], who observed low levels of IgM. As patients with RTS present both mental and motor deficiencies that lead to plaque accumulation and as diminished immunological response may also be present and associated to periodontal breakdown, preventive measures and periodontal evaluation could be taken more frequently in patients with RTS.

What this case report adds

- This case report presents a Rubinstein-Taybi syndrome patient and discusses the possible association between the syndrome and periodontal disease.

Why this paper is important for paediatric dentists

- RTS patients present immunological deficiencies that may be a risk factor for periodontal disease.
- Periodontal treatment may be performed successfully in RTS patients.
- Preventive periodontal care should be routine in RTS patients.

References

1 Michail J, Matsoukas J, Theodorou S. Pouce bot argue en forte abduction-extension et autres symptoms concomitants. [Arched, clubbed thumb in strong abduction-extension and other concomitant symptoms.] *Revue de chirurgie orthopedique et reparatice de l'appareil moteur* 1957; **43**: 142–146.

2 Rubinstein JH, Taybi H. Broad thumbs and toes and facial abnormalities: a possible mental retardation syndrome. *American Journal of Diseases of Children* 1963; **105**: 588–608.

3 Cirillo RL. Pediatric case of the day. Rubinstein-Taybi syndrome. *Radiographics* 1997; **17**: 1604–1605.

4 De Silva B. What syndrome is this? *Pediatric Dermatology* 2002; **19**: 177–179.
5 Gardner DG, Girgis SS. Talon cusps: a dental anomaly in the Rubinstein–Taybi syndrome. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* 1979; **47**: 519–521.
6 Genderen MMV, Kinds GFRF, Hennekam RCM. Ocular features in Rubinstein–Taybi syndrome: investigation of 24 patients and review of the literature. *British Journal of Ophthalmology* 2000; **84**: 1177–1184.
7 Hennekam RCM VDJ. Oral aspects of Rubinstein–Taybi syndrome. *American Journal of Medical Genetics Supplement* 1990; **6**: 42–47.
8 Hennekam RCM SC, Van de Kamp JJP. Etiology and recurrence risk in Rubinstein–Taybi syndrome. *American Journal of Medical Genetics Supplement* 1990; **6**: 56–64.
9 Hennekam RCM, Van DenBoogaard MJSB, Van Spijker HG. Rubinstein–Taybi syndrome in the Netherlands. *American Journal of Medical Genetics Supplement* 1990; **6**: 3–16.
10 Kimura H, Ito Y KY, Hase Y. Rubinstein–Taybi syndrome with thymic hypoplasia. *American Journal of Medical Genetics* 1993; **46**: 293–296.
11 Ming JE, Stiehm R GJJ. Immunodeficiency as a component of recognizable syndromes. *American Journal of Medical Genetics* 1996; **66**: 378–398.
12 Mustacchi Z PS. *Mustacchi Z PS Principais Síndromes baseadas em evidências* [Main syndromes-based evidence], 2nd edn. São Paulo: CID, 2000: 123–134.
13 Rivas F, Fragoso RR-ZR, Vaca G, *et al*. Deficient cell immunity and mild intermittent hyperaminoacidemia in a patient with the Rubinstein–Taybi syndrome. *Acta Paediatrica Scandinavica* 1980; **69**: 123–125.
14 Rubinstein JH. Broad thumb–hallux (Rubinstein–Taybi) syndrome 1957–1988. *American Journal of Medical Genetics Supplement* 1990; **6**: 3–16.
15 Rubinstein JH, Taybi H. Broad thumbs and toes ans facial abnormalities: a possible retardation syndrome. *American Journal of Diseases of Children* 1963; **105**: 588–608.
16 Schepis C, Greco DSM, Batolo D, Romano C. Rubinstein–Taybi syndrome with epidermal nevus: a case report. *Pediatric Dermatology* 2001; **18**: 34–37.
17 Stevens CA, Carey JC BB. Rubinstein–Taybi syndrome: a natural history study. *American Journal of Medical Genetics Supplement* 1990; **6**: 30–36.
18 Villella A, Bialostocky DLE, Meyerson H, Hostoffer RW. Rubinstein–Taybi syndrome with humoral and cellular defects: a case report. *Archives of Disease in Childhood* 2000; **83**: 260–261.
19 O'Neil DW, Canada RT, Clark MV, Lowe JW. Rubinstein–Taybi syndrome: case report. *Pediatric Dentistry* 1989; **11**: 158–160.
20 Gardner DG, Girgis SS. Talon cusps: a dental anomaly in the Rubinstein–Taybi syndrome. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* 1979; **47**: 519–521.
21 Baker MA. Dental and oral manifestations of Rubinstein–Taybi syndrome: report of case. *ASDC Journal of Dentistry for Children* 1987; **54**: 369–371.
22 Cheung WS. Rubinstein–Taybi syndrome. *Journal of Canadian Dental Association* 1989; **55**: 821–822.
23 Deas DE, Mackey AS, McDonnell HT. Systemic disease and periodontitis: manifestations of neutrophil dysfunction. *Periodontology 2000* 2003; **32**: 82–104.