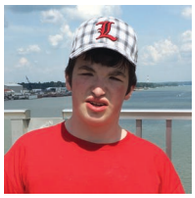
Rubinstein-Taybi Syndrome: At a Glance

Rubinstein-Taybi Syndrome (RTS) is a rare genetic condition, affecting about 100,000 to 125,000 newborns each year worldwide[1,2,3,4]. In 50–60% of cases, RTS is the result of CREBBP gene mutations on chromosome 16p13[1,2,3,4], also sometimes referred to as RTS Type 1. Individuals with this form of RTS have many of the following characteristics: large, angular thumbs and broad first toes, a distinct angular nose, small stature, thick hair and eyelashes, downward slanting eyes, and a narrow palate[1,2,3,4]. A rarer genetic variation that affects 3–8% of diagnosed individuals is the result of EP300 gene mutations on chromosome 22[4,5], which is sometimes referred to as RTS Type 2. These individuals have some of the same features seen in RTS Type 1, but facial features may be milder and thumbs are less likely to be angled outward[2].

Genetic testing is done to confirm a "medical diagnosis" of RTS most of the time[6,7]. Testing can be done at any age, but the average age of diagnosis is 15 months[15]. However, in about 30% of cases, individuals with typical features of RTS do not have identified CREBBP or EP300 gene mutations, meaning the cause of RTS is unknown[3]. In these cases, a geneticist might make a "clinical diagnosis" based on presenting physical characteristics of RTS, rather than genetic testing confirmation[6,7].

Things to Think About During Each Life Stage*

INFANCY: Low muscle tone; difficulties with feeding and drinking[1,6,7,14]



ADOLESCENCE: Puberty starts; behavior concerns; increased need for sleep; continuing weight concerns; discussions about pregnancy/ pregnancy prevention[6,14,15,23]

EARLY CHILDHOOD: Weight gain; sleep issues due to breathing obstructions; gastrointestinal concerns; tethered cord; keloids[1,2,6,14,15,24]

TRANSITION TO ADULTHOOD: Transition from pediatric to adult healthcare providers; employment and day programs; community living

SCHOOL AGE: Social and engaged; continuing weight concerns; dental concerns[1,2,6,14,15,22,23]

ADULTHOOD AND AGING: Spine curvatures; vision issues; keloids; tumors; increased behavior concerns; frequent check-ins with specialists; aging and end-of-life planning[6,13,18]

these lists are not comprehensive

For more information, check out our RTS booklet, **www.bit.ly/2We6EUR** or contact us at **rts@cchmc.org, 513-636-4723**

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Dr. Jack Rubinstein Foundation
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Healthcare Guidelines

MEDICAL CONCERNS BY SPECIALTY

Anesthesiology
- Pre-op appointment strongly encouraged due to increased risk of aspiration and/or cardiac arrest, air way differences may impact intubation[2,5,6]

Cardiology
- Congenital heart disease occurs in about 30% of individuals with RTS[1,6,15]

Dermatology
- Keloids can form as a result of skin healing from trauma (surgery, insect bite, vaccination, etc.) and form most frequently on chest and back[24]

Gastroenterology
- Issues with reflux, gagging, and spitting up are common in babies. A feeding tube may be required[6]
- Issues with constipation common
- More likely to have malrotated intestines[30]

Genitourinary
- Increased likelihood of constipation can lead to frequent urinary tract infections
- Males experience delayed descent of testicles[6]

Neurology
- Tethered cord is common[25,26]
- Symptoms of tethered cord include toileting issues after being toilet-trained, difficulty sitting upright, and lower back and leg pain

Ophthalmology
- Glaucoma and/or strabismus as an infant is common, as is chronic water or discharge from the eye[6,13,14]

Orthopedics
- Issues with the way bones are formed and flexibility of tendons may result in causing kneecaps to slip, hip problems, and back and leg pain[13,14]

Respiratory/ENT
- At risk for frequent ear infections and mild hearing loss[13]
- Small nasal passages and airways may lead to respiratory infections and pneumonia[1,6,13]
- Surgery to remove enlarged tonsils and adenoids may be recommended to address obstructive sleep apnea[6]

WHAT TO SHARE WITH FAMILIES/ CAREGIVERS?

- Connect to appropriate medical and developmental specialists as well as community supports if possible.
- Encourage families to reach out to local and/or state Developmental Disability services agencies for support and resources.
- Share the "Understanding Rubinstein-Taybi Syndrome: A Guide for Families and Professionals" booklet to increase awareness of the syndrome and their child's needs. Find an electronic copy of the booklet here: **www.bit.ly/2We6EUR**
- Encourage them to keep detailed records of doctors' visits, using a care notebook or similar, so their healthcare providers can collaborate if needed.
- Provide them with the Cincinnati Children's Hospital (CCHMC) RTS website for more information on RTS: **www.bit.ly/2Hekgvl**
- Encourage them to join Facebook Support groups, such as the "Rubinstein Taybi Syndrome Group" or "Family and Friends support for Rubinstein-Taybi Syndrome (RTS)."

"Morgan has taught us to appreciate the smallest of victories. Every new little skill that he learns brings us a bit of hope." *Morgan's mom and dad*

1. Hennekam RCM. The Rubinstein-Taybi syndrome. In Cassidy SB, Allanson JA, eds. Management of Genetic Syndromes 3rd ed. Hoboken, NJ: Wiley; 2010:705-716.
2. Milani D, Manzoni FM, Pezzani L, et al. Rubinstein-Taybi syndrome: clinical features, genetic basis, diagnosis, and management. Ital J Pediatr. 2015;41(1):4.
3. Fergelot P, Van Belzen M, Van Gils J, et al. Phenotype and genotype in 52 patients with Rubinstein- Taybi syndrome caused by EP300 mutations. Am J Med Genet A. 2016;170(12):3069-3082.
4. Schorry EK, Keddache M, Lanphear N, et al. Genotype-Phenotype Correlations in Rubinstein-Taybi Syndrome. Am J Med Genet A. 2008;146A:2512-2519.
5. Roelfsema JH, White SJ, Ariyürek Y, et al. Genetic Heterogeneity in Rubinstein–Taybi syndrome: Mutations in both CBP and EP300 genes cause disease. Am J Med Genet A. 2005;76:572-580.
6. Wiley S, Swayne S, Rubinstein JH, Lanphear NE, Stevens CA. Rubinstein-Taybi syndrome medical guidelines. Am J Med Genet A. 2003;119(2):101-10.
7. Hennekam RC. Rubinstein-Taybi Syndrome. Eur J of Hum Genet. 2006;14(9):981-985
13. Stevens CA, Pouncey J, Knowles D. Adults with Rubinstein-Taybi syndrome. Am J Med Genet A. 2011;155(7):1680-4. doi.org/10.1002/ajmg.a.34058.
14. Sescleifer A, Stevens CA. Rubinstein-Taybi Syndrome National Organization for Rare Disorders. Published 2018. https://rarediseases.org/rare-diseases/rubinstein-taybi- syndrome/. Accessed April 17, 2018.
15. Stevens CA, Carey J. Rubinstein-Taybi: Book for Families. http://rubinstein-taybi.com/medical-7/ book-for-families/. Accessed April 12, 2018
18. Yagihashi T, Kosaki K, Okamoto N, et al. Age-dependent change in behavioral feature in Rubinstein-Taybi syndrome. Congenital anomalies. 2012;52(2):82-86.
22. Stevens CA, Hennekam RC, Blackburn BL. Growth in the Rubinstein-Taybi syndrome. Am J Med Genet. 1990;37(S6):51-55.
23. Beets L, Rodríguez-Fonseca C, Hennekam RC. Growth charts for individuals with Rubinstein–Taybi syndrome. Am J Med Genet A. 2014;164(9):2300-9.
24. Van De Kar AL, Houge G, Shaw AC, et al. Keloids in Rubinstein-Taybi Syndrome; a clinical study. Br J Dermatol. 2014;171(3):615-621. doi:10.111/bjd.13124.ch47.
25. Hertzler DA, DePowell JJ, Stevenson CB, Mangano FT. Tethered cord syndrome: a review of the literature from embryology to adult presentation. Neurosurgical Focus 2010;29(1) E1.
26. American Association of Neurological Surgeons. Tethered Cord Syndrome. https://www.aans.org/Patients/Neurosurgical-Conditions-and-Treatments/Tethered-Spinal-Cord-Syndrome. Accessed January 2, 2019.
30. Stevens CA. Intestinal malrotation in Rubinstein-Taybi Syndrome. Am J Med Genet A. 2015;167(10):2399-2401. doi/full/10.1002/ajmg.a.37167.