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內文：

Introduction

The disease:

-1960, Gorlin and Goltz : 3 parameter (the classical triad)

1. multiple nevoid basal-cell epitheliomas
2. keratocysts in the jaws
3. bifid ribs

- terminology:

1. multiple nevoid basal-cell epithelioma, jaw cysts and bifid rib syndrome
2. Gorlin-Goltz syndrome (GGS)
3. nevoid basal cell carcinoma syndrome
4. basal-cell nevus syndrome

- other characteristics (besides the classical triad):

1. macrocephaly, eyes widely separated, broad nasal root, Mild mandibular prognathism
2. palmar and plantar pits
3. calcification of the falx cerebri
4. medulloblastoma
5. ovarian fibroma

(more than 100 minor features have been described)

- diagnosis

1. combination of clinical and histological features
2. heavily dependent on family history
3.criteria (1993, Evans et al. & modified by Kimonis et al.)

Table 1. Diagnostic criteria for Gorlin-Goltz syndrome proposed by Kimonis *et al.*

Diagnosis of Gorlin-Goltz Syndrome made in the presence of two major or one major and two minor criteria:
Major criteria
1. More than two basal cell carcinomas or one under the age of 20 years
2. Odontogenic keratocysts of the jaw proven by histology
3. Three or more palmar or plantar pits
4. Bilamellar calcification of the falx cerebri
5. Bifid, fused, or markedly splayed ribs
6. First degree relative with Gorlin-Goltz syndrome
Minor criteria
1. Macrocephaly determined after adjustment for height
2. Congenital malformations: cleft lip or palate, frontal bossing, "coarse face," moderate or severe hypertelorism
3. Other skeletal abnormalities: Sprengel deformity, marked pectus deformity, and marked syndactyly of the digits
4. Radiological abnormalities: Bridging of the sella turcica, vertebral anomalies such as hemivertebrae, fusion or elongation of the vertebral bodies, modeling defects of the hands and feet, or flame shaped lucencies of the hands or feet
5. Ovarian fibroma
6. Medulloblastoma

- inheritance pattern
1. autosomal dominant
2. PTCH1 gene
-prevalence
1. varies according to the country
2. 1 / 60,000
3. men and women equally affected
4. all ethnic groups, but the white are mostly reported
5. black cases:28 cases(1960~1994), 22 cases(1994~2012)

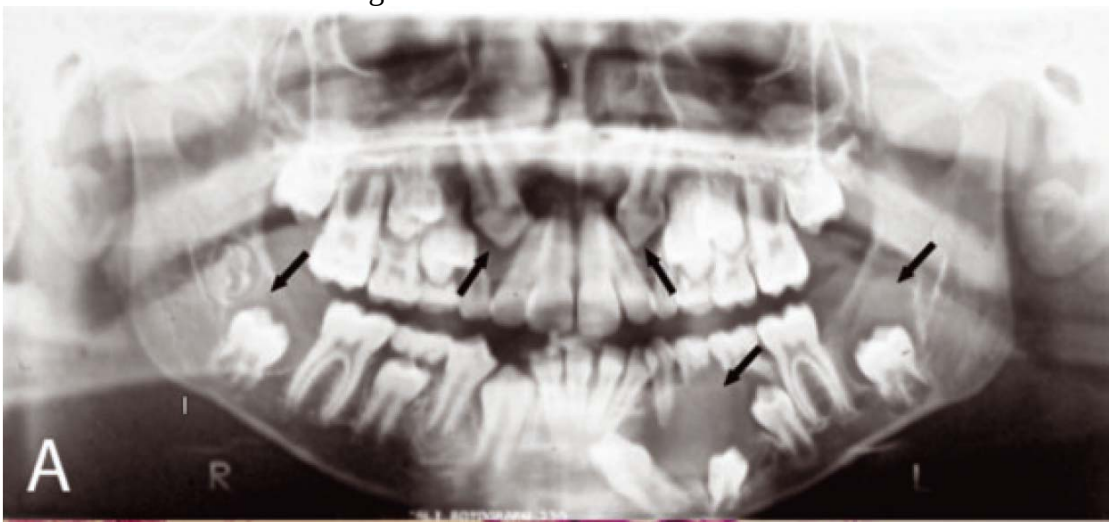
Table 2. Clinical and radiographic findings described in case reports of black patients with the Gorlin-Goltz Syndrome published by Goldstein *et al.*[19] and after their study (until 2012).

Author(s)	Cases (No.)	Gender	Age (years)	Described characteristics
Goldstein *et al.*[19]	1	M	60	Palmar and/or plantar pits, skin cysts, jaw cysts, possible basal cell carcinomas, synophrys
	2	F	31	Palmar and/or plantar pits, skin cysts, three basal cell carcinomas, café-au-lait spot, neurofibroma, jaw. cysts, malocclusion, calcification of the falx cerebri, scoliosis, bifid ribs, missing/malformed ribs, Sprengel, deformity, hypertelorism, strabismus, synophrys, ovarian fibroma, epicanthal folds, abnormal fundi
	3	F	40	Palmar and/or plantar pits, one possible basal cell carcinoma, jaw cysts, malocclusion, calcification of the falx cerebri, scoliosis, short 4th metacarpal, brachycephaly, mandibular prognathism, cortical cysts, synophrys
	4	M	38	Palmar and/or plantar pits, three basal cell carcinomas, skin tags, jaw cysts, scoliosis, frontal bossing
	5	M	35	Palmar and/or plantar pits, jaw cysts, calcification of the falx cerebri, missing/malformed ribs, short 4th metacarpal, brachycephaly
	6	M	30	Palmar and/or plantar pits, skin cysts, one basal cell carcinoma, milia, neurofibroma, jaw cysts, calcification of the falx cerebri, scoliosis, missing/malformed ribs, hypertelorism
	7	M	29	Palmar and/or plantar pits, jaw cysts, mandibular prognathism
	8	F	61	Palmar and/ or plantar pits, skin cysts, hypopigmented areas on skin, jaw cysts, scoliosis
	9	F	37	Palmar and/or plantar pits, jaw cysts, calcification of the falx cerebri, mandibular prognathism, slight torus (palate)
	10	F	17	Palmar and/or plantar pits, polydactyly-bilateral, jaw cysts, calcification of the falx cerebri, scoliosis, short 4th metacarpal, parietal bossing, childhood seizures (onset age 3 years)
	11	M	14	Palmar and/or plantar pits, one basal cell carcinoma, partial cleft lip; subglottic web/narrowing; skin tag, jaw cysts, calcification of the falx cerebri, scoliosis, bifid ribs, missing/malformed ribs, fusion of ribs, Sprengel deformity, frontal bossing, dolichocephaly, mandibular prognathism, broad nasal root, pectus carinatum, epicanthal folds, childhood seizures (onset age 3 years)
Shimkets *et al.*[20]	12	F	15	Macrocephaly, frontal bossing, synophrys, mandibular prognathism, palmar and plantar pits, and scoliosis, spina bifida occulta of T2 and T3 and several bifid ribs
Korczak *et al.*[21]	13	M	8	Odontogenic keratocyst, palmar and plantar pits, medulloblastoma, basal-cell carcinomas (areas irradiated for medulloblastoma), frontal bossing, ocular hypertelorism, high-arched palate, slightly large head circumference
	14	F	38	Odontogenic keratocyst, extensive calcification of the falx cerebri and dura mater, high-arched palate, large head circumference, small cystic osteolytic lesions of the tubular bones (hands, distal radius, and ulna)
Hall *et al.*[5]	15	M	11	Multiple maxillary and mandibular odontogenic keratocysts, palmar and plantar pits, multiple 1 mm fleshcolored papules (nasal bridge, forehead, and preauricular areas), exotropia secondary to an impacted molar displaced into the orbit
Li *et al.*[22]	16	F	26	Palmar pits, scoliosis, ophthalmologic abnormalities (cataracts, uveitis, glaucoma, vitreitis), basal cell carcinomas[a]
Kimonis *et al.*[23]	17	M	6	Medulloblastoma, flame-shaped lucencies of the hands[a]
	18	F	NR	Flame-shaped lucencies of her metacarpal, phalanges, distal radii, and ulna[a]
Smucker and Smith (2006)[24]	19	M	2.5	Macrocephaly, bilateral rib fusion and segmentation anomalies, frontal and biparietal bosselation, hypertelorism, medulloblastoma, mild ventriculomegaly
Sobota *et al.*[25]	20	M	19	Medulloblastoma, meningioma, thyroid follicular adenomas with papillary carcinoma, basal cell carcinomas, sinonasal undifferentiated carcinoma, mandibular odontogenic keratocyst, liver fibromyxoid lesion, multiple dural lesions along the tentorium
Reti *et al.*[26]	21	M	31	Mild ocular hypertelorism, frontal and temporal bossing, multiple enlarged nevi with regular borders, diffuse dural calcifications of the falx cerebri, tentorium and lateral convexities, maxillary and mandibular odontogenic keratocysts
Simiyu *et al.*[27]	22	M	20	Maxillary and mandibular odontogenic keratocysts, multiple basal cell carcinomas, bifid ribs, intracranial calcifications

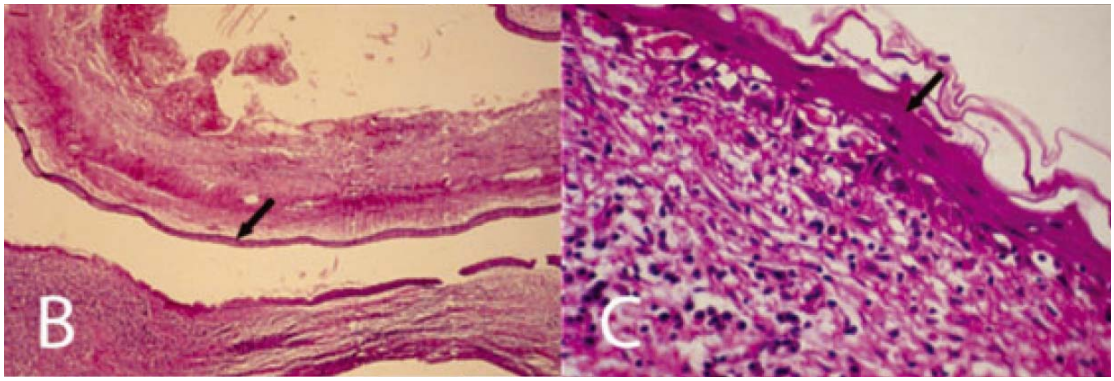
[a]The other possible features were not reported.
NR= not reported.

-purpose of this paper
report clinical and oral findings in an Afro-Brazilian family (son, daughter, and mother) with GGS
Case series
Case 1—Son
-Age : 9

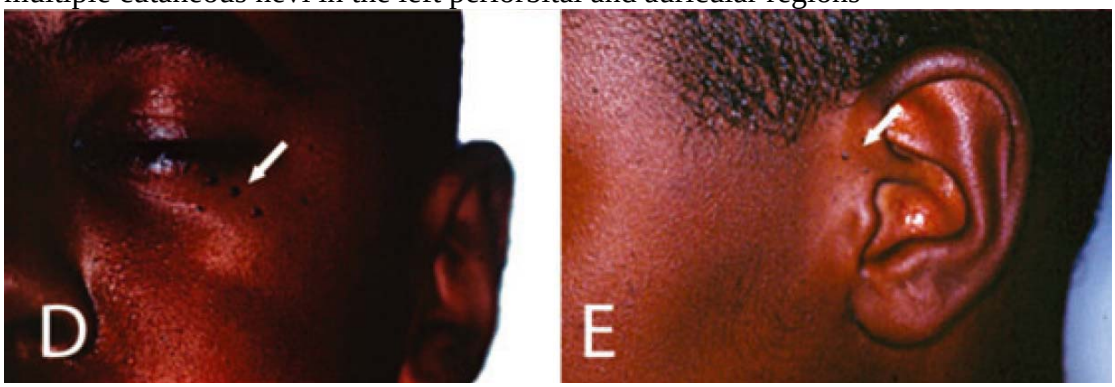
-Ethnic: Afro-Brazilian
-First visit: Pediatric Dental Clinic at the Federal University of Rio de Janeiro, Brazil
-C.C.: painless swelling of the left mandible
-Previous medical history: surgery for cryptorchidism
-Intraoral examination:
1. mixed dentition without carious lesions
2. expansion of the alveolar ridge near the left deciduous mandibular second molar
-Panoramic findings:
1. A well-defined unilocular radiolucent lesion located in the left mandible associated with unerupted permanent canine and premolars.
2. left permanent canine and first premolar were displaced inferiorly near to the basal mandibular region
3. Root resorption of the left deciduous first and second molars associated with the lesion
4. Other four unilocular lesions were detected bilaterally associated with unerupted permanent canines in the maxilla and to unerupted permanent second molars in the mandible
5. On the left side, the mandibular lesion involving the permanent second molar extended to the left ascending ramus



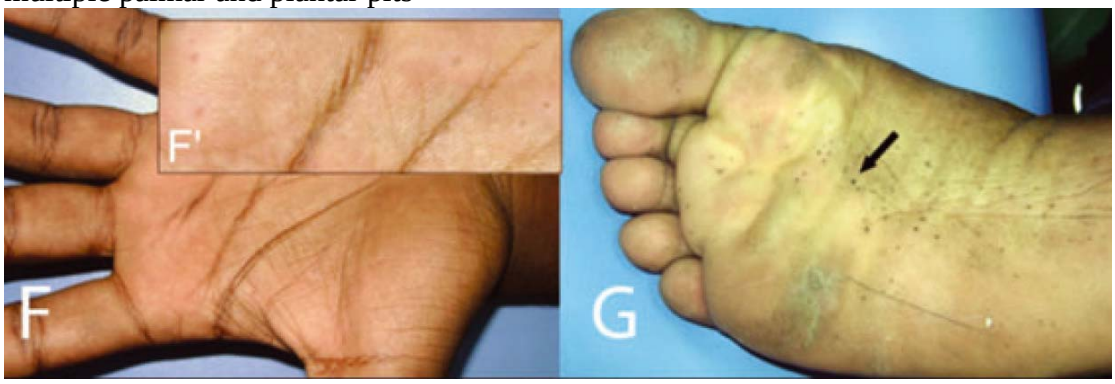
Imaging findings: suggestive of odontogenic keratocysts
Confirmed after surgical decompression and histopathological examination of the cysts' wall
Histopathological finding: (four specimens)
1. wall of regular thickness composed of fibrous tissue
2. free of inflammation
3. lined by a uniformly thin parakeratinized stratified squamous epithelium
4. The epithelial lining showed absence of rete pegs as well as pallisading of the nuclei of the basal cells



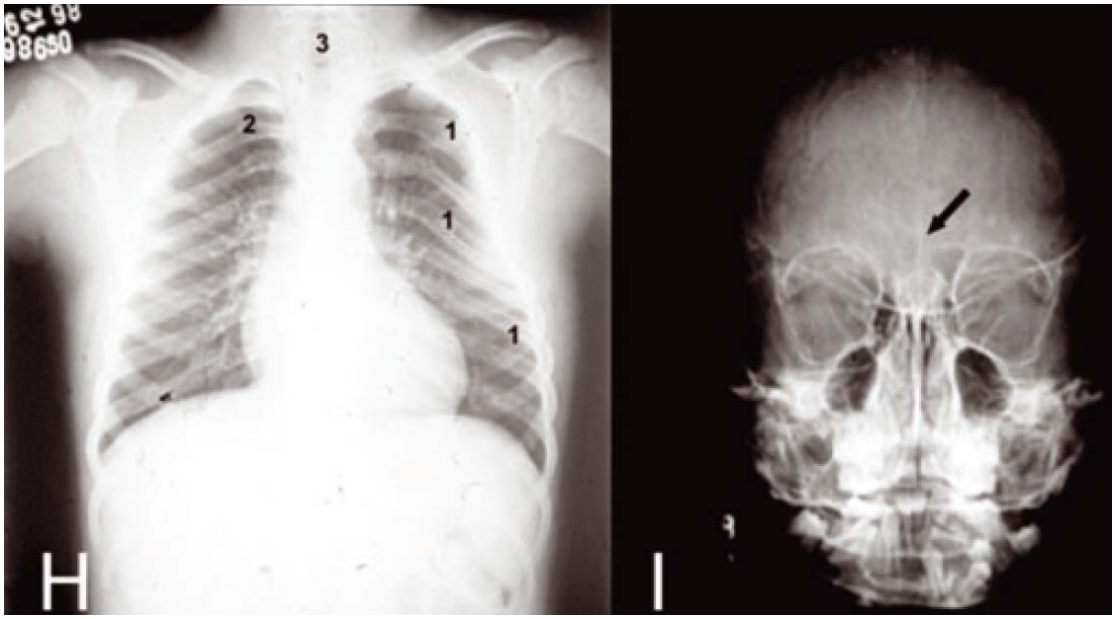
Clinical examination of the skin:
multiple cutaneous nevi in the left periorbital and auricular regions



multiple palmar and plantar pits



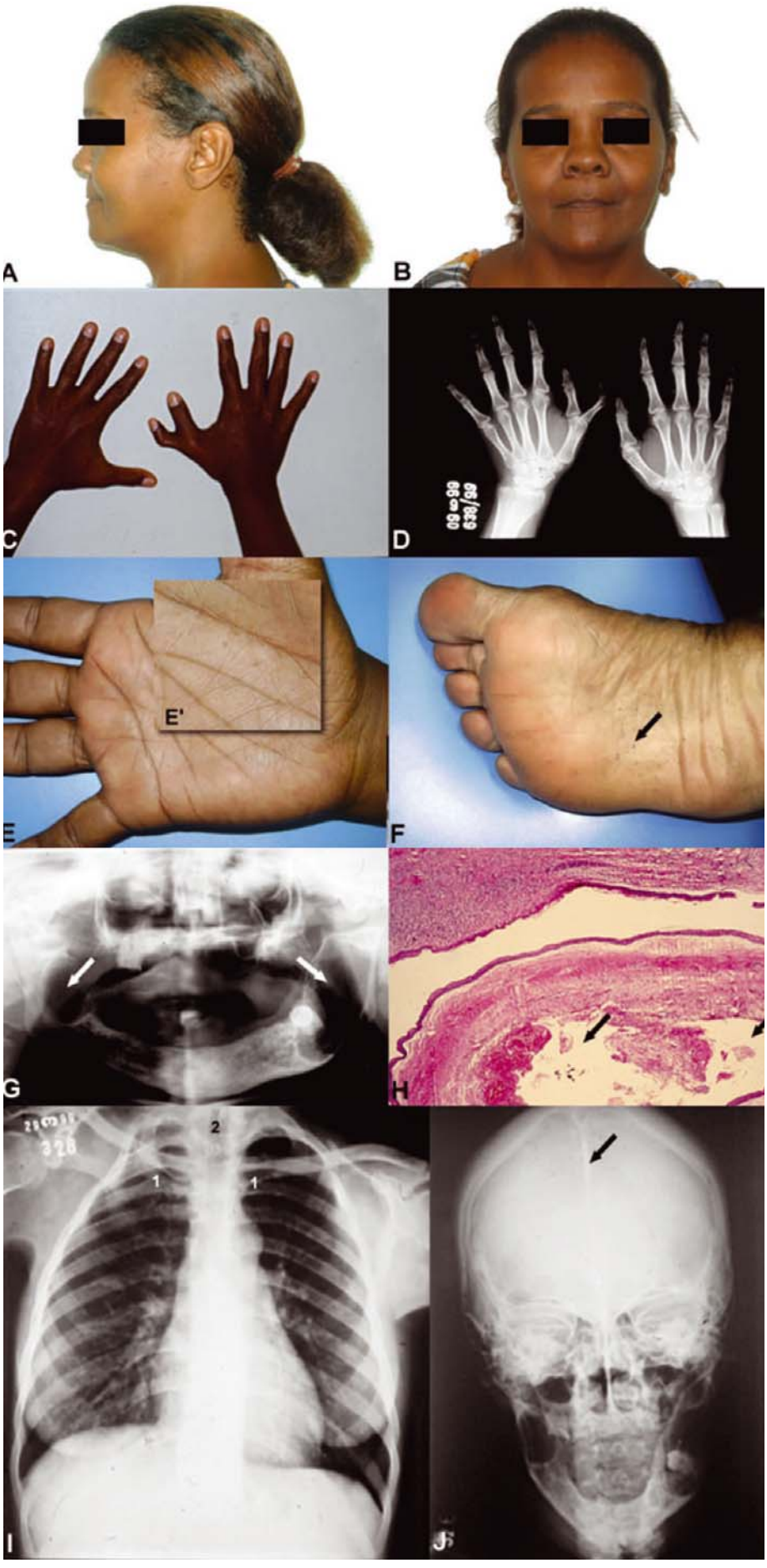
histopathological, intra-, and extraoral findings led to the clinical diagnosis of GGS
Chest radiograph:
1. bifid aspect of the third, fifth, and sixth ribs on the left side
2. fusion anomaly of the right first and third ribs
3. spina bifida occulta was noted in T 1 and T2
posteroanterior skull radiograph : incipient calcification of the falx cerebri



-These skeletal anomalies confirmed the diagnosis of GGS, which was, therefore, also investigated in his first degree relatives.
-the patient: keep f/u
Case 2—Mother
Age: 39
PMD: previous ovarian surgery for cysts' removal
Clinical examination:
1. large head circumference
2. prognathism
3. hypertelorism
4. scoliosis(脊柱側彎)
5. polydactyly(多指) of the right hand
6. palmar and plantar pits

Panoramic film finding:
1. two well-defined unilocular expansile osteolytic lesions in the right and left ascending rami of the mandible
2. On the left side, the lesion was associated with an unerupted permanent molar

Histological examination:
confirmed the hypothesis of odontogenic keratocysts with the presence of satellite cysts


A
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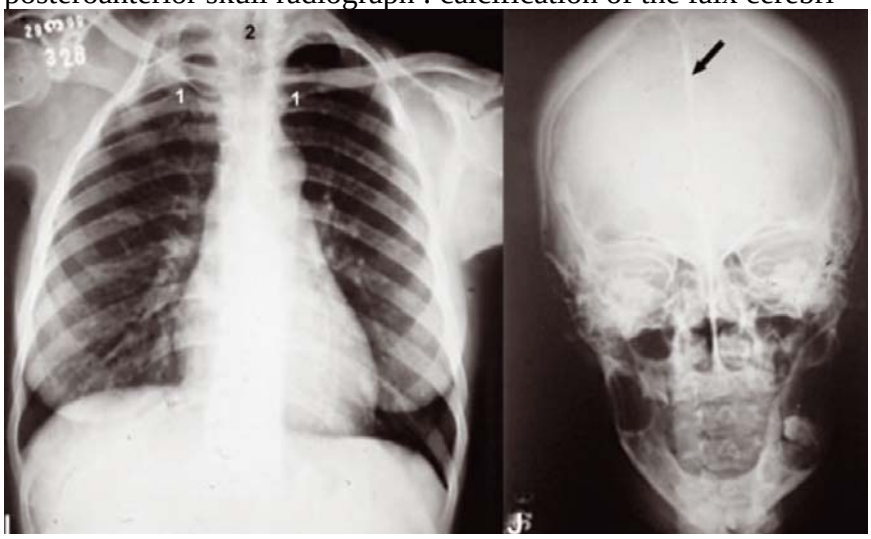
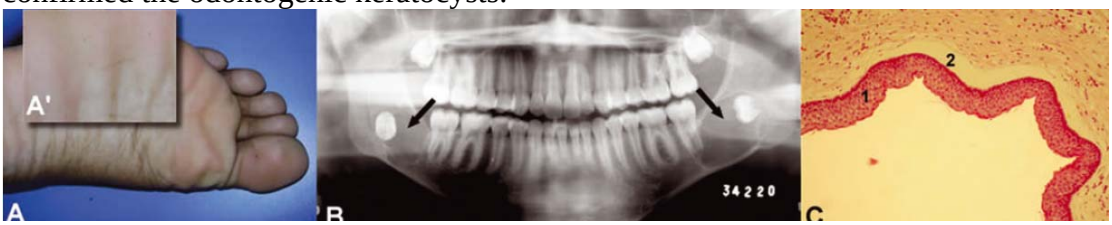
posteroanterior chest radiograph :
1.confirmed the scoliosis(脊柱側彎)
2. bifid aspect of the third ribs on the right and left sides
3. spina bifida occulta in T 1 and T 2
posteroanterior skull radiograph : calcification of the falx cerebri



All the above described features characterized the presence of GGS in the mother too, who did not know about the syndrome until our clinical examination.
→ she also started regular follow-up after cysts' removal
Case 3—Sister
Age: 15
PMD: unremarkable
Clinical examination: plantar pits
Panoramic radiograph:
1. two unilocular cystic lesions extended from the retromolar space bilaterally to the right and left ascending rami of the mandible.
2. Both lesions were associated with unerupted permanent third molars, which were displaced posteriorly
Incisional biopsy of the oral lesions was performed and histopathological examination confirmed the odontogenic keratocysts.



Discussion

1. diagnosis: table 1, 2 major / 1 major and 2 minor diagnostic criteria
Case 1: 5 major, 1 minor
Case 2: 5 major, 6 minor
Case 3: 3 major, 0 minor
2. Black populations :
-no advantage against developing or inheriting GGS(although a high concentration of melanocytes has been associated with a decreased chance of basocellular carcinoma (BCC) proliferation)
- lack of BCC formation may further delay diagnosis of early GGS
-Therefore,GGS seems to be unusual in black persons

3. importance of family investigation
4.the need for molecular genetic testing(PTCH) (our cases no need)
5. Odontogenic keratocyst :
-representative signs of GGS in the first and the second decades of life
-asymptomatic but may cause swelling, loosening or displacement of erupted or developing teeth
-can recur and can be locally invasive causing bone destruction of the jaw
-origin: from dental lamina or its remnants
-common site: retromolar region in place of the third molar
-histologic appearance : thin cyst wall, palisaded basal layer that often separates from the surrounding connective tissue, without inflammatory infiltration ,a variable number of microcysts and epithelial islets
- Comparisons between syndromic and nonsyndromic keratocysts:
1. keratocysts in GGS : multiple , increased number of satellite cysts and solid islands of epithelial proliferation
2. when compared to solitary keratocysts, GGS keratocysts are more frequently parakeratinized
-other defect of GGS:(pits of the palms and soles, spine and rib abnormalities, ectopic calcifications, and macrocephaly)
1. caused by the lack of a partial or complete absence of the corneal stratum
2. usually get developed in the second decade of life, increasing in the number with the age
3. useful diagnostic trait of GGS as pointed out by Kimonis et al
- falx calcification:
1. age of onset remains uncertain, but rare in children
2. develops with increasing age
3. case 1: showed an incipient calcification of the falx cerebri
Conclusion
1. odontogenic keratocysts in children should alert dental clinicians to look for signs and symptoms that may suggest GGS
2. once detected, close relatives should be carefully examined for the Syndrome even if they belong to an ethnic group in which this diagnosis is unusual

題號	題目
1	戈林症候群（Gorlin syndrome）與下列何種惡性腫瘤最有關 (A) 分化良好之口腔鱗狀細胞癌 (B) 疣狀癌 (C) 淋巴瘤 (D) 基底細胞癌（basal cell carcinoma）
答案(D)	出處：牙醫國考 101 年基礎 1
題號	題目
2	以下何者最不可能是 Gorlin syndrome 的特徵？ (A) Café au lait spots (B) macrocephaly (C) Odontogenic keratocyst (D) palmar/plantar pits
答案(A)	出處：Oral and Maxillofacial pathology,2nd,Nevielle,p598,599