was noted (fig 1). Bilateral postaxial polydactyly was found in both upper and lower limbs (fig 2). External genitalia were at an undifferentiated stage. There were only two vessels in the cord. The whole body was serially sectioned, stained with haematoxylin and eosin, and examined microscopically. Internal anomalies included alobar holoprosencephaly with absence of midline structures, ventricular septal defect (membranous portion), and single umbilical artery. No abnormalities were noted in the trachea, lungs, gastrointestinal tract, liver, pancreas, or urogenital organs. Histologically, the gonadal sex was male.

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References

1 Young ID, Madders DJ. Unknown syndrome: holoprosencephaly, congenital heart defects, and polydactyly. *J Med Genet* 1987;**24**:714–5.
2 O'Rahilly R, Müller F. *Developmental stages in human embryos.* Washington DC: Carnegie Institution of Washington, 1987.

Syndactyly, ectodermal dysplasia, and cleft lip and palate

SIR,

Recently, each of us reported independently in the journal a family in which two children were affected with a syndrome which seemed to be new.[1 2]

TABLE *Main clinical features of the syndrome.*

	Zlotogora et al[1]		*Ogur and Yuksel*[2]	
Sex	Male	Female	Male	Male
Cleft lip and palate	+	+	+	+
Partial syndactyly				
Fingers	3–4	3–4	2–3–4	2–3–4
Toes	2–3*	2–3*	2–3	2–3
Ectodermal dysplasia				
Abnormal hair	+ Pilli torti	+	+ 'Kinky'	+
Thickened, dry skin	+†	–	+	+
Abnormal teeth	+	NR	+	+
Normal nails	+	+	+	+
Mental retardation	Mild‡	NR	Moderate	
Consanguineous parents	+		+	

–=Not present in the child. NR=not relevant since the child died very young.
*Owing to an error in the original article the syndactyly of the toes was reported to be between toes 3 and 4.
†Appeared at the age of four years, mainly on the palms and soles.
‡At the age of four years the child had caught up most of the delay and was only mildly retarded. Speech was very delayed.

Comparison of the clinical signs show that although the families are unrelated, the affected children present with very similar features, which are summarised in the table. It seems that this represents a distinct syndrome which is inherited as an autosomal recessive disorder. Additional cases are needed for further delineation of the syndrome.

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References

1 Zlotogora J, Zilberman Y, Tenenbaum A, Wexler MR. Cleft lip and palate, pili torti, malformed ears, partial syndactyly of fingers and toes, and mental retardation: a new syndrome? *J Med Genet* 1987;**24**:291–3.
2 Ogur G, Yuksel M. Association of syndactyly, ectodermal dysplasia, and cleft lip and palate: report of two sibs from Turkey. *J Med Genet* 1988;**25**:37–40.

Are 'upper' and 'lower' neural tube defects aetiologically different?

SIR,

The idea that anencephaly and spina bifida cystica are aetiologically related, since each occurs with increased frequency in sibs of probands with the other,[1] may need reconsideration. In two studies,[2 3] families of probands with neural tube defects were classified according to whether the lesion was 'upper' (anencephaly and thoracic spina bifida, which arise by failure of neurulation) or 'lower' (lumbar and sacral, which represent errors in canalisation[4]). All of 25 sib pairs were concordant as to level, suggesting that the two types are genetically different.[2 3] T11 to T12 was considered the dividing point between upper and lower lesions.

In contrast, during an epidemiological study of neural tube defects in Newfoundland,[5] we noted 11 pairs of affected sibs, without other malformations, of which four were discordant for level of lesion.

In family A, a girl was born with a lumbosacral myelomeningocele involving L1 to S3, with diastematomyelia of L1 (lower), followed by a sister with anencephaly and cervical spina bifida (upper). In family B, a girl with a lumbosacral myelomeningocele involving L1 to S3 (lower) was followed by a brother with a myelomeningocele of T10 to S3 (upper). In family C, the first boy was born with a tuft of hair in

the lumbosacral region and radiological evidence of spina bifida from L3 to the end of the spinal column (lower), and the second boy had a large myelomeningocele with a skin defect from T3 to L3 (upper). No radiographs were taken and there was no necropsy. Sib 1 of family D, a girl, also had spina bifida occulta with a tuft of hair in the lumbar region. Radiographs of the spinal process showed an anomalous bony bar at L2, diastematomyelia of L1 and L2 with tethering of the cord below this level, and a thickened filum terminale (lower). Her sister was born with a myelomeningocele with spina bifida from T9 downwards (upper).

Possible explanations for the discrepancy between this and the two previous studies are as follows.

(1) The occurrence of discordant sibs in four families was coincidental, both types occurring independently in the same family. This is very unlikely.

(2) The patients with the lower lesions really had some involvement of the upper spine. *X* rays were carefully examined for such lesions and none was found.

(3) The dividing line between the two types is lower than T12. To account for family B it would have to be as low as L3.

(4) There is a factor predisposing to neural tube defects that affects both upper and lower parts of the neural tube, possibly more prevalent in regions of high frequency such as Newfoundland (3·2/1000 births)[6] than of lower frequency such as British Columbia (1·6/1000)[7] or central USA, where the other two studies were done.

Clearly the question requires further examination.

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References

1 Fraser FC, Maldoff SR, Lippman-Hand A. Evidence against a female specific class of neural tube defect. *J Med Genet* 1983;**20**:78–9.
2 Toriello HV, Higgins JV. Possible causal heterogeneity in spina bifida cystica. *Am J Med Genet* 1985;**21**:13–20.
3 Hall JG, Keena BA. Adjusting recurrence risks for neural tube defects based on BC data. *Am J Hum Genet* 1986;**39**:64A.
4 Lemire RJ, Loeser JD, Leech RW, Alvord EC. *Normal and abnormal development of the human nervous system*. Hagerstown: Harper and Row, 1975.
5 Frecker MF, Fraser FC. Epidemiological studies of neural tube defects in Newfoundland. *Teratology* 1987;**36**:355–61.
6 Fraser FC, Frecker M, Allderdice P. Seasonal variation of neural tube defects in Newfoundland and elsewhere. *Teratology* 1986;**33**:299–304.
7 McBride ML. Sib risks of anencephaly and spina bifida in British Columbia. *Am J Med Genet* 1979;**3**:377–87.