

Sex Chromosome Abnormalities in Mentally Retarded Criminals

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Summary. Forty offenders were found during a one year period among 1272 individuals under the care of the Copenhagen Center for mentally retarded adults. Chromosomal investigation showed that 35 had normal chromosomes, while 4 showed a 47,XYY and 1 a 47,XXY karyotype. The XYY patients were all tall men, seriously mentally disturbed but only slightly mentally retarded. The type of crime committed by the XYY males did not differ from the types committed by the offenders with normal chromosomes.

Zusammenfassung. Unter 1272 Personen, die sich unter der Pflege der Kopenhagener Centralinstitution für erwachsene Schwachsinnige befanden, wurden im Laufe eines Jahres 40 Kriminelle gefunden. Die Chromosomenuntersuchung zeigte, daß 35 einen normalen Chromosomenbefund aufwiesen, 4 hatten einen 47,XYY und einer einen 47,XXY Karyotyp. Die Patienten mit XYY Chromosomen waren alle sehr groß, sie zeigten ernsthafte psychiatrische Symptome, waren aber nur im leichten Grade schwachsinnig. Die Typen der begangenen Verbrechen waren die selben bei den XYY Männern wie bei denen mit normalen Chromosomen.

Key words: XYY Karyotype — Sex Chromosome abnormalities.

In 1965 it was shown by Jacobs and her colleagues that men with an additional Y chromosome were found in unusually large numbers in the Scottish State Hospitals (Jacobs *et al.*, 1965). They observed 7 out of 196 inmates and this observation was substantiated by a similar finding in Special Hospitals in England (Casey *et al.*, 1966). High numbers of men with two Y chromosomes were also observed in comparable institutions in France (Noel *et al.*, 1969) and Denmark (Nielsen, 1968).

The presence of an additional Y chromosome was shown to be associated with increased stature. Surveys of tall inmates in prisons in England (Casey *et al.*, 1966), Australia (Wiener *et al.*, 1968) and in the USA (Goodman, Smith and Migeon, 1967) showed also an increased number of men with XYY constitution.

At that time, the incidence of the XYY constitution in the normal population was not known with certainty. Since then, surveys carried out on babies shortly after birth have shown that the frequency of XYY males in a newborn population is about 1:700 (Jacobs, 1970). As no increased mortality of persons with 47, XYY chromosomes has been detected, it is reasonable to assume that the frequency in an adult population is about the same. Jacobs and colleagues (1971) wanted to determine the frequency of XYY males in criminals as the XYY constitution was thought to be associated with criminal behaviour and many of the cases found in special hospitals had a history of admission to penal and corrective institutions.

They examined 2538 males from a variety of penal and corrective institutions. They did not find a significant difference between the incidence of males with an abnormal sex chromosome complement in these establishments and the incidence in a newborn population. They concluded that the increased risk of criminal behaviour in the XYY male is confined to those who are mentally disordered and liable to be admitted as patient offenders to State Security hospitals.

As many of the XYY males found in Security hospitals were reported to be slightly mentally retarded we wanted to determine the incidence of sex chromosome abnormalities among mentally retarded offenders.

Material and Methods

During a period of one year all offenders, both first offenders and recidivists irrespective of height were selected for examination. They were all under the care of "Lillemosegård", which is the regional center of all mentally retarded adults in Copenhagen under the Danish National Board of Social Welfare, Department of Mental Retardation. Among a total of 1272 individuals under the care of the Center, a total of 40 male offenders were found.

They were all examined cytogenetically. Blood was cultured in the usual way for 48 to 72 hours, a total of 10 cells were analysed. If an abnormal karyotype was found the investigation was supplemented with autoradiography and/or fluorescence staining. In these cases between 10 and 50 cells were examined.

The results of the cytogenetic investigation are given in Table 1. All offenders were examined psychiatrically and intelligence-tests were carried out. In addition a clinical examination was carried out.

Results

35 of the offenders had a 46,XY karyotype, 4 had a 47,XYY constitution and one offender with an 47,XXY karyotype was observed. At the time of investigation, the probands were between the age of 16 and 41 years. The distribution is given in Table 2. No difference in the age distribution between XY and XYY males was found.

Table 3 shows the patients age at their first conviction. The ages for the XYY men were 7 years, 17, 18 and 25 years, the XXY male was 17 years old when he started his criminal career. There was no significant difference between the XY and the XYY males. The intelligence quotients are given in Table 4. Only five of all offenders had IQ below 64. Both the XY and the XYY offenders were mostly found in the IQ range 70 to 85, a group of patients generally considered as borderline cases.

Familial background of criminal behaviour was known in 10 out of the 34XY males and in one case of the 4XYY males. In one case, the father has been in conflict with the law, the parents were divorced and the mother committed suicide. In 2 of the XYY cases the family history and social background was apparently normal. In the fourth case, the parents were divorced. The patient was seriously disturbed with violent behaviour, sexual offences and several attempts of suicide. He finally committed suicide in 1970 by shooting. The clinical investigation in the 4XYY cases showed the typical picture with height over average: 181, 190, 198 and 205 cm. The weights were correspondingly: 86, 92, 133 and 90 kg. Only one of the XY offenders was of same height and in the same

Table 1. *Cytogenetic data*

Karyotype	46,XY	47,XYY	47,XXY
No. of cases	35	4	1

Blood culture was examined in all cases. No structural rearrangements observed.

Table 2. *Age distribution*

	15-19	20-24	25-29	30-34	35-39	Over 40
XY	1	5	17	9	2	1
XYY		2	1	1		
XXY			1			

Table 3. *Age at first conviction*

	Under 10	10-15	16-20	Over 20
XY	1	8	19	7
XYY	1	—	2	1
XXY	—	—	1	—

Table 4. *Distribution of IQ*

	Below 60	60-64	65-69	70-74	75-79	80-84	85-90
XY	1	4	1	10	7	10	2
XYY	—	—	1	1	1	1	—
XXY	—	—	—	—	—	1	—

weight class. The psychiatric evaluation in the XYY cases showed a tendency to emotional lability. They were immature with overdependency and contact seeking but unable to get good contact. Three were seriously disturbed, one nearly psychotic, one megalomaniac with paranoid tendencies and the third was the one who committed suicide. Only one was considered in the normal range. They all had difficulties with their sexual life.

The type of crime committed by the 40 offenders were: Theft, housebreaking, robbery, fraud, arson, theft with violence, malicious damage and indecency. The only murder-case had a 46,XY karyotype. No correlation between the type of crime and the karyotype was observed. Theft was the most often committed crime both for men with the XY and the XYY karyotype.

Discussion

The very high number of men with sex chromosome abnormalities, especially the XYY karyotype in our sample may reflect an accumulation of such cases under the Department of Mental Retardation. This may be explained by the legal

system in Denmark. There is a strong tendency by court to send offenders with subnormal or borderline intelligence to institutions for the mentally retarded. If such persons were sentenced to institutions or even only to the care of the Department of Mental Retardation, the Department has to provide facilities for this category of patients. This can be extremely difficult, especially as they differ considerably from the ordinary mentally retarded patients. At "Lillemosegård" it has been possible to provide the offenders with excellent facilities partially away from the other patients. They are provided with intensive social assistance, school-tuition and close contact with an interested and engaged staff. These facilities are so new, that it is impossible to say, whether there is any chance of resocializing some of the offenders.

We found the same high frequency of XYY males in our institution as Jacobs (1968) did in institutions providing facilities for maximum security. This may reflect a variation in provision of facilities for treatment of the mentally disordered offender. However, the appearance of these very tall, big and dull men, may predestine them to special institutions. In our limited sample, we could not confine the observation of Price *et al.* (1967) who found a significantly earlier start in XYY individuals.

Finally it may be concluded, that tall men with criminal behaviour and subnormal intelligence who are mentally disordered should be examined cytogenetically. They may have an abnormal karyotype. It is however still not quite clear if the XYY karyotype is connected with criminal behaviour in a higher degree than for men with normal chromosomes. Only a follow up of the XYY babies found in the surveys of newborns will give the answer if criminal behaviour is part of the clinical picture in men with XYY karyotypes.

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