

# Screening of testicular descent in older boys is worthwhile: an observational study

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## ABSTRACT

### Background

Testicular descent in boys is now routinely screened only once, at 6–8 weeks of age. Early surgery for undescended testes is recommended.

### Aim

To assess the value of screening for testicular descent at 6–8 weeks, 8–9 months, and 39–42 months of age.

### Design of study

Observational study.

### Setting

Royal Hospital for Sick Children, Glasgow and the Scottish community-based Child Health Surveillance Programme.

### Method

Screening data for boys undergoing surgery for abnormal testicular descent between April 2006 and September 2007 was reviewed. The main outcome measure was median age at first operation for abnormal testicular descent comparing attendance at screening with non-attendance.

### Results

Boys who attended screening underwent surgery at a significantly younger median age than boys who did not attend screening at 6–8 weeks (2.7 versus 7.7 years;  $P < 0.001$ ); 8–9 months (4.5 versus 9.7 years;  $P < 0.001$ ); and 39–42 months (7.8 versus 10.8 years;  $P = 0.014$ ). A new diagnosis was made in 33% (42 of 128 boys) at 6–8 weeks, 28% (21/74) at 8–9 months, and 39% (15/38) at 39–42 months. Detection on screening did not always trigger referral. Referral was triggered by screening in 48% (62/128) of cases, and by incidental examinations in 27% (34/128).

### Conclusion

The previous screening regimen was effective, but checks at 8–9 months and 39–42 months have recently been abolished. Reinstatement of screening for testicular descent in older boys is advocated because screened boys underwent surgery at a younger age. Doctors should be encouraged to check testicular descent in boys throughout childhood, and refer promptly when there is any concern.

### Keywords

child; child, preschool; cryptorchidism; mass screening; testis.

## INTRODUCTION

In the UK, the Child Health Surveillance Programme has undergone recent changes. Previously, all children in the UK were invited to attend several screening encounters in primary care. In Scotland, this included assessment of testicular descent in boys at 6–8 weeks, 8–9 months, and 39–42 months of age. Following the publication of *Health for All Children*,<sup>1</sup> recommendations were made, without apparent evidence base, to abolish later screening checks for testicular descent. Children throughout the UK are now routinely invited to only one screening examination in primary care at 6–8 weeks of age. Recently published international guidelines<sup>2,3</sup> recommend early surgery (between 6 and 18 months of age) for undescended testes to optimise the benefits on testicular development and function.<sup>4–7</sup>

The aim of this study was to assess the value of screening for abnormal testicular descent at 6–8 weeks, 8–9 months, and 39–42 months of age, in an attempt to inform future public health decisions relating to this element of the Child Health Surveillance Programme.

## METHOD

Boys who had surgery for abnormal testicular descent (orchidopexy) at Glasgow's Royal Hospital for Sick Children between April 2006 and September 2007 were identified from the prospective theatre

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## How this fits in

Routine screening for abnormal testicular descent in boys is now restricted to only one examination at 6–8 weeks of age; checks at 8–9 months and 39–42 months have recently been abolished. Current guidelines favour early surgery for undescended testes. A testicle that was once fully descended can subsequently ascend during childhood. Boys who attended checks at 8–9 months and 39–42 months of age underwent orchidopexy at an earlier age than boys who did not attend.

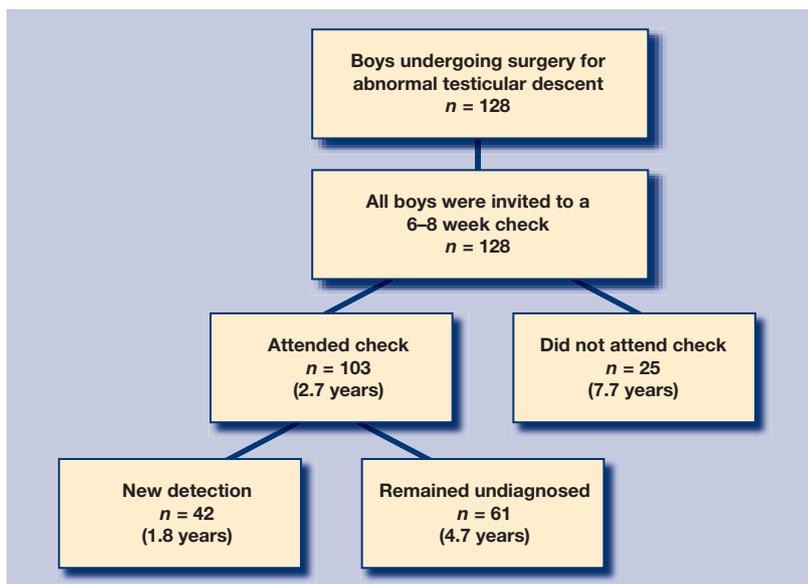
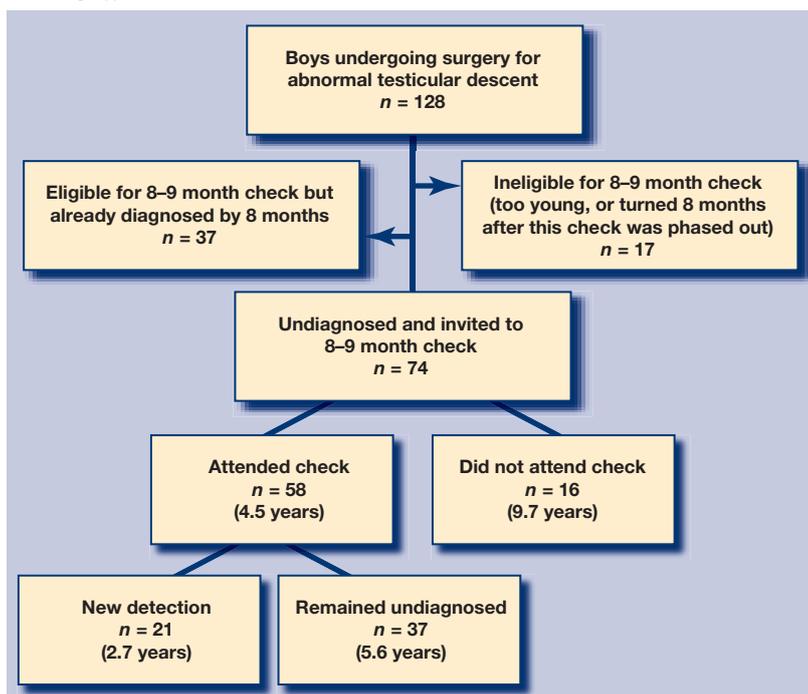


Figure 1. Number of boys in each subgroup at the 6–8-week check, (median age at first surgery).

Figure 2. Number of boys in each subgroup at the 8–9-month check, (median age at first surgery).



database. Data collected by retrospective casenote review included a national patient identification code, date of referral, date of surgery, and the trigger that prompted referral (screening examination, parental concern, or incidental detection during another medical encounter). If a boy had more than one relevant operation, the first referral and first operation were used for analysis.

Using the national patient identification code for each boy, the testes' position documented by the screening practitioner at each screening encounter attended was obtained from the NHS Information Services Division prospective database. All boys were invited to a check at 6–8 weeks of age. Only some boys were eligible for routine invitation to checks at 8–9 months and 39–42 months of age, as these checks were abolished in the authors' health board on 1 April 2006 in response to *Health for all Children*.<sup>1</sup> Boys who were old enough to have been invited prior to abolition of these checks, were described as 'invited'. Boys were described as 'undiagnosed' if no previous confirmed or suspected diagnosis of abnormal testicular descent had been made (on screening or otherwise) before they attended the check that was being analysed.

At each check, the screening practitioner could describe each testis to be 'normal', 'abnormal', 'doubtful', or 'incomplete examination/not done'. When no screening data was recorded it was assumed the child did not attend that check. The study defined an abnormally descended testis as 'detected' if screening findings were 'abnormal' or 'doubtful', or if referral for surgical opinion occurred immediately after that check.

The primary outcome tests attendance at screening against non-attendance, using median age at first operation for abnormal testicular descent as the measure; lower age is beneficial. Undiagnosed boys who were invited to each check who did attend (irrespective of the examination findings or action taken) were compared with undiagnosed boys who were invited to that check but did not attend. In addition, the study describes the number of boys having a new detection of abnormal testicular descent at each check, and the number in whom both testes were 'normal' at each check; both are expressed as percentages of all undiagnosed boys invited to that check.

Outcome measures are presented separately for each of the three screening episodes studied (6–8 weeks, 8–9 months, and 39–42 months). Median ages were compared using a two-tailed Mann–Whitney test. Statistical significance was defined by  $P < 0.05$ . Analysis was performed using GraphPad InStat (version 3.05; GraphPad, San Diego, CA).

## RESULTS

Data were collected for 128 boys who underwent orchidopexy at Glasgow's Royal Hospital for Sick Children during the 18-month study period. Figures 1–3 illustrate the number of boys in each subgroup at each of the three screening encounters, with the median age at first surgery in parentheses.

The median age at surgery was found to be significantly lower in boys who attended screening when compared with those who did not attend (Table 1). In previously undiagnosed boys who attended screening, the median age at surgery was lower in those who had a new detection of abnormal testicular descent on screening when compared with those who remained undiagnosed (Table 2).

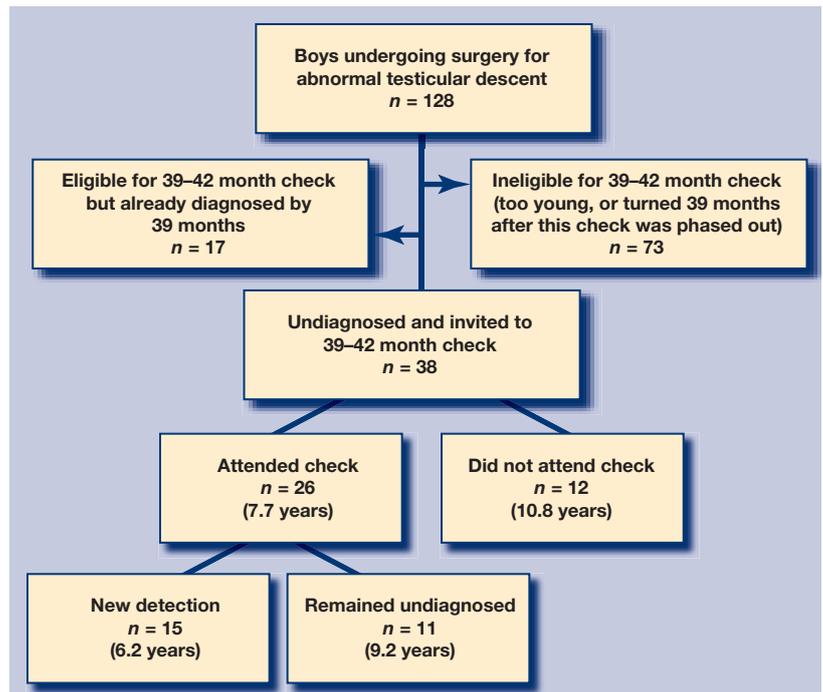
In boys who were invited to screening and had previously been undiagnosed, a new diagnosis of abnormal testicular descent was made in 33% (42/128) of boys at 6–8 weeks, 28% (21/74) at 8–9 months, and 39% (15/38) at 39–42 months. As such, cumulatively, screening was responsible for detection of abnormal testicular descent in 61% (78/128) of all boys. However, detection on screening did not always trigger referral to the study's unit. Referral was triggered by screening in 48% (62/128) of boys, by incidental examinations in 27% (34/128) and by parental concern in 13% (17/128); the trigger was unclear in 12% (15/128) of boys.

In those boys who were invited to screening and previously undiagnosed (all of whom ultimately underwent orchidopexy), both testes were considered to be in a 'normal' position in 45% (57/128) of boys at 6–8 weeks, 43% (32/74) at 8–9 months, and 26% (10/38) at 39–42 months.

## DISCUSSION

### Summary of main findings

Screening for abnormal testicular descent now only takes place routinely in primary care at 6–8 weeks of age in the UK; checks at older ages have been abolished. A third of the boys in this study's cohort had their undescended testes detected at the 6–8 week check. Those detected on screening at 6–8 weeks had timely surgery at a median age of 1.8 years. However, it was found that new detections of abnormal testicular descent were also made in 28% of boys at 8–9 months, and 39% at 39–42 months of age. Boys who attended checks at 8–9 months and 39–42 months of age (before they were abolished) underwent orchidopexy at a significantly younger age than boys who did not attend these checks, irrespective of the examination findings or action taken. Unsurprisingly, boys who had abnormal testicular



descent detected on screening underwent orchidopexy at a younger age than those who remained undiagnosed at that screening encounter.

**Figure 3.** Number of boys in each subgroup at the 39–42-month check, (median age at first surgery).

### Strengths and limitations of this study

The inclusion criterion was surgery for abnormal testicular descent performed between April 2006 and September 2007. This allowed the study to collect contemporary data reflecting practice after implementation of the new screening programme. However, boys who turned 8–9 months and 39–42 months of age during this period were no

**Table 1.** Median age at first surgery in boys who attended a check versus those who did not.

Check	Attended check Age at surgery (95%CI)	Did not attend check Age at surgery (95%CI)	P-value
6–8 weeks	2.7 years (3.4 to 4.6)	7.7 years (5.5 to 9.5)	<0.001
8–9 months	4.5 years (4.5 to 6.1)	9.7 years (8.3 to 12.0)	<0.001
39–42 months	7.7 years (6.8 to 9.0)	10.8 years (8.7 to 13.1)	0.014

**Table 2.** Median age at first surgery in boys in whom a new detection was made upon attending check versus those who remained undiagnosed despite attending check.

Check	New detection Age at surgery (95%CI)	Remained undiagnosed Age at surgery (95%CI)	P-value
6–8-weeks	1.8 years (1.6 to 2.9)	4.7 years (4.4 to 5.9)	<0.001
8–9 months	2.7 years (2.7 to 4.7)	5.6 years (5.2 to 7.2)	<0.001
39–42 months	6.2 years (5.5 to 8.7)	9.2 years (7.6 to 10.4)	0.055

longer routinely invited to screening, hence the opportunity to detect abnormal testicular descent in those boys was missed. There may be a group of such boys with abnormal testicular descent, who have yet to come to the attention of a surgeon; as such, the data may underestimate the detection rate at the 8–9 month and 39–42 month checks. However, this cohort represents the study's final opportunity to analyse the value of screening at 8–9 months and 39–42 months in an era during which early surgery has been promoted in international guidelines.<sup>2</sup>

The study speculates that the effect of not inviting boys to routine screening will be similar to the effect observed in this study's group of boys, who did not attend screening when invited; namely, older age at surgery. The study accepts that there are inherent differences between not inviting boys to screening and non-attendance when invited. A prospective population-based study with long-term follow-up would, therefore, be required to confirm or refute this study's speculation.

In this study no attempt was made to analyse the value of screening at birth. Screening at birth is a non-universal component of the Child Health Surveillance Programme, and this situation remains unchanged since the implementation of the recommendations in *Health for All Children*.<sup>1</sup>

#### **Comparison with existing literature**

Undescended testes were detected at 6–8 weeks in a third of the boys in the study's cohort. This correlates closely with findings of other studies from the UK.<sup>8,9</sup>

The ascending testis is now accepted as a condition in its own right, distinct from the congenitally undescended testis.<sup>8,10–12</sup> In correlation with other series,<sup>8,13</sup> almost half the boys in this study who attended screening at 6–8 weeks and 8–9 months were found to have normally descended testes at those checks, although they later went on to require orchidopexy. In some, the diagnosis of congenitally undescended testes may have been missed; however, it is probable that many of these boys developed ascending testes and were, indeed, 'normal' at the earlier checks. Martin reported that 46% of boys who required surgery for abnormal testicular descent had documentation of scrotal testes at birth, 6 weeks, or both.<sup>8</sup> The authors agree with Elliman, co-editor of *Health for All Children*,<sup>1</sup> who stated that the issue of testicular ascent will need to be addressed by the National Screening Committee.<sup>14</sup> This study's data supports the existence of ascending testes. In order to detect and operate on them in a timely fashion, screening of older boys is beneficial

A population-based study of orchidopexy rates in Australia found a decline between 1993 and 2006.<sup>15</sup> This coincided with a reduction in routine childhood screening in their population. The decline in orchidopexy rate may represent reduced incidence of abnormal testicular descent, failure of diagnosis, or failure of management. If the explanation is failure of diagnosis, a similar pattern may occur in the UK following the recent changes to the screening programme.

#### **Implications for future research and clinical practice**

Further research could investigate the median age at orchidopexy in the population to assess the impact of changes in the screening programme. However, as demonstrated in Bonney *et al*'s study of orchidopexy trends in Australia, it is difficult to differentiate true changes in incidence (for example, due to environmental factors) from failure of diagnosis or failure of management.<sup>15</sup> Population-based studies of age at orchidopexy, as reported by McCabe and Kenny in England,<sup>17</sup> rely on long-term observations. This study demonstrates that screening for testicular descent at 8–9 months and 39–42 months was effective; this raises serious ethical difficulties in delaying reinstatement of these checks, pending such long-term studies.

A new detection of abnormal testicular descent on screening facilitates surgery at a younger age compared with boys who remain undiagnosed despite attending that check. Also, attendance itself (irrespective of examination findings or action taken) was associated with younger age at surgery. Perhaps parental awareness of abnormal testicular descent is heightened, prompting earlier consultation if concern arises later. In *Health for All Children*,<sup>1</sup> it is stated that 'parents can be shown how to check the testicular descent themselves' but relying on parental examination alone is inappropriate — even experienced practitioners find examination for testicular descent challenging.<sup>11</sup>

Over a quarter of the boys in this study came to the attention of a surgeon after their abnormal testicular descent was detected incidentally when attending a doctor for another reason. All doctors should be aware of their potentially valuable role in detection of this common condition in all boys;<sup>16</sup> particularly now, in the absence of routine screening throughout childhood.

It is clear from the findings that the previous screening regimen of examinations at 6–8 weeks, 8–9 months, and 39–42 months was effective in the detection of congenitally undescended testes and ascending testes. Boys who attended such

screening had surgery at a significantly younger age than boys who did not attend. The study hypothesises that the new reduced-frequency screening programme will result in delayed detection, later referral and, hence, increased median age of orchidopexy in the population. The study advocates that screening for abnormal testicular descent in boys after 6–8 weeks of age should be reinstated and aimed at detecting ascending testes, as well as late detection of congenitally undescended testes. All health professionals should be aware that incidental examination for testicular descent in boys is valuable. Early referral to an appropriate surgeon is desirable when there is any suspicion of abnormal testicular descent.

### Ethical approval

No ethical approval was sought to perform this study. This has been considered not to be required for the following reasons: data collection took place for an audit project, and this was undertaken with permission of the Clinical Effectiveness Department, NHS Greater Glasgow & Clyde; information was obtained from the NHS Information Services Division. (Data held by Information Services on NHS patients have been notified under the Data Protection Act 1998 for purposes including research. Data has been handled in accordance with the rules detailed in their confidentiality statement).

### Competing interests

The authors have stated that there are none.

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