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MEDICAL BENEFITS FROM CIRCUMCISION

The author of this page has also written a book that provides the most extensive, balanced and up-to-date coverage of the circumcision issue. To find out more about this recent publication click [here](#).

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Circumcision is the removal of a fold of loose skin (the foreskin) that covers the head (glans) of the unerect penis. The amount of this skin varies from virtually none, to a considerable amount that droops down from the end of the flaccid penis. The practice is common amongst many divergent human cultures. A variety of methods are, moreover, used and the amount of foreskin removed also varies.

Historically circumcision has been a topic of emotive and often irrational debate. At least part of the reason is that a sex organ is involved. (Compare, for example, ear piercing.) During the past two decades the medical profession in Australia have tended to advise parents not to circumcise their baby boys. In fact there have even been reports of harrassment by medical professionals of new mothers, especially those belonging to religious groups that practice circumcision, in an attempt to stop them having this procedure carried out. Such attitudes are a far cry from the situation years ago when baby boys were circumcised routinely in Australia. But over the past 20 years the rate has declined to as low as 16-19% [\[81\]](#).

However, a reversal of this trend is starting to occur. In the light of an increasing volume of medical scientific evidence pointing to the benefits of neonatal circumcision a new policy statement was formulated by a working party of the Australian College of Pediatrics in August 1995 and adopted by the College in May 1996 [\[6\]](#). In this document medical practitioners are now urged to fully inform parents of the benefits of having their male children circumcised. Similar recommendations were made recently by the Canadian Paediatric Society who also conducted an evaluation of the literature, although concluded that the benefits and harms were very evenly balanced [\[37\]](#). The American Academy of Pediatrics has moved far closer to an advocacy position and many recognised authorities in the USA strongly advocate circumcision of all newborn boys. More details of their statements appear later.

In the present literature review I would like to focus principally on the protection afforded by circumcision against infection by micro-organisms, some of which can cause disease and even death, but will also touch on other aspects, including sexual benefits. I might add that I am a university academic who teaches medical and science students and who does medical research, including that involving genital cancer virology, as well as molecular biology and genetics of cardiovascular disease. I am not Jewish, nor a medical practitioner or lawyer, so have no religious bias or medico-legal concerns that might get in the way of a rational presentation of the information that has been published in reputable journals.

Why the foreskin increases infection risk

It has been suggested [\[18\]](#) that the increased risk of infection in the uncircumcised may be a consequence of the fact that the foreskin presents the penis with a larger surface area, the moist skin under it represents a thinner epidermal barrier than the drier, more cornified skin of the circumcised penis (the glans of which develops a thick stratum corneum layer), and the presence of a prepuce is likely to result in greater microtrauma during sexual intercourse, thereby permitting an entry point into the bloodstream for infectious agents. Also, as one might expect and as has been observed, the warm, moist mucosal environment under the foreskin favours growth of micro-organisms (discussed later). The preputial sac has even been referred to by Dr Gerald Weiss, an American surgeon, as a 'cesspool for infection' [\[142\]](#), as its unfortunate anatomy wrapped around the end of the penis results in accumulation of secretions, excretions (urine), dead cells and growths of bacteria. Parents are told not to retract the foreskin of male infants which makes cleaning difficult. Even if optimal cleansing is performed there is no evidence that it confers protection [\[152\]\[153\]](#).

History

Circumcision has been practiced widely in Western countries this century. In the USA it increased from 8% in 1870 to 56% in 1910 [\[98\]](#). In Britain it rose from 19% for those born in 1914 to 22% for 1924 and 30% for 1930 [\[98\]](#). From at least the mid-1940s to mid-1970s over 90% of boys in the USA and Australia were circumcised soon after birth. The major benefits at that time were seen as improved lifetime genital hygiene, elimination of phimosis (inability to retract the foreskin) and prevention of penile cancer.

A trend not to circumcise started in the mid to late 1970s, after the American Academy of Pediatrics Committee for the Newborn stated, in 1971, that there are 'no valid medical indications for circumcision' [\[19\]](#). However, in 1975 this was modified to 'no absolute valid ...' [\[134\]](#), which remained in the 1983 statement, but in 1989 it changed significantly to 'New evidence has suggested possible medical benefits ...' [\[3\]](#). A new statement is to appear in 1998.

Dr Edgar Schoen, Chairman of the Task Force on Circumcision of the American Academy of Pediatrics, has stated that the benefits of routine circumcision of newborns as a preventative health measure far exceed the risks of the procedure [\[115\]](#). During the period 1985-92 there was an increase in the frequency of postnewborn circumcision and during that same time Schoen points out that the association of lack of circumcision and urinary tract infection (UTI) has moved from 'suggestive' to 'conclusive' [\[115\]](#). Moreover, it heralded the finding of associations with other infectious agents, including HIV. In fact he goes on to say that 'Current newborn circumcision may be considered a preventative health measure *analogous to immunization* in that side effects and complications are immediate and usually minor, but benefits accrue for a lifetime' [\[115\]](#).

Benefits included: a decrease in physical problems involving a tight foreskin [\[92\]](#), lower incidence of inflammation of the head of the penis [\[32\]\[33\]\[36\]\[138\]](#), reduced urinary tract infections, problems with erections, especially at puberty, decrease in certain sexually transmitted diseases (STDs) such as HIV, and, in older men, elimination of penile cancer and a decrease in urological problems and infections [reviewed in [3,6,37,69,110,113](#)]. Therefore the benefits are different at different ages.

Different specialists see different things

Neonatologists only see the problems of the operation itself. Moreover such problems occur in only a minor proportion of boys, and generally because of poor technique by an inexperienced operator. However, urologists who see and have to treat the problems of uncircumcised men cannot understand why all newborns are not circumcised [\[113,115\]](#). Other health care workers in hospitals and aged care homes also have adverse comments about the uncircumcised penises they see. The demand for circumcision later in childhood has increased, but, with age, there is an inevitable increase in worry to the boy or man in the lead up to having this done, and there may be a more visible scar left. This, coupled with the advantages of early circumcision, led Schoen to state 'Current evidence concerning the life-time medical benefit of newborn circumcision favours an affirmative choice' [\[115\]](#).

Anti-circumcision lobby groups

There are several of these. One of the largest is 'NOCIRC'. In a letter written by Dr Schoen to Dr Terry Russell in Brisbane in 1994 Schoen derides 'NOCIRC' for their use of 'distortions, anecdotes and testimonials to try to influence professional and legislative bodies and the public, stating that in the past few years they have become increasingly desperate and outrageous as the medical literature has documented the benefits. For example they have compared circumcision with female genital mutilation, which is equivalent to cutting off the penis. In 1993 the rate of circumcision had risen to 80% in the USA and Schoen suggests that 'Perhaps NOCIRC has

decided to export their "message" to Australia since their efforts are proving increasingly futile in the USA. One only has to do a search on the World Wide Web to read the statements from this group and others like it and any intelligent person can quickly make up their own mind about the quality of their material and the message they are trying to promulgate. Some of these people mean well and some are intelligent, but lack a broad perspective. Dr Schoen also noted that when Chairman of the Task Force his committee was bombarded with inaccurate and misleading communications from this group. A member of NOCIRC emailed me from the USA to say: "I've come to learn I can't trust [NOCIRC] when it comes to *this* subject. I think they are causing a tremendous degree of psychological harm with their campaign and I've suffered a lot from their nonsense."

The anti-circ. groups have an array of literature and even publish their own 'journal', '*Circumcision*', which appears only on the world-wide web, and includes articles that are not subjected to unbiased peer review. This propaganda vehicle should really be titled '*Anti-circumcision*'. The Editor of this 'journal' is an outspoken critic of circumcision. His writings appear superficially convincing to the naive. However, various authorities have shown how he distorts, misquotes, and misrepresents the bulk of the literature he claims support his opinions and even misconstrues his own published findings (on balanitis) [154]. The anti-circ. documents quote a Dr Paul Fleiss extensively. Fleiss was given a suspended sentence for laundering the business proceeds of his infamous daughter, Heidi Fleiss, the Hollywood madam who provided prostitutes to celebrities. This raises the question of credibility.

Another of these groups is 'UNCIRC', which promotes procedures to reverse circumcision, by, for example, stretching the loose skin on the shaft of the retracted penis or the use of surgery. This has led to genital mutilation [140]. Claimed benefits of 'increased sensitivity' in reality appear to be a result of the friction of the foreskin, whether intact or newly created, on the moist or sweaty glans and undersurface of the prepuce in the unaroused state and would obviously in the 're-uncircumcised' penis have nothing to do with an increase in touch receptors. Indeed, nerves do not regenerate. Moreover, the sensitivity during sexual intercourse is in fact identical, according to men circumcised as adults. In the first detailed professional analysis of psychiatric aspects eight patients seeking prepuce restoration were studied and several psychological disorders were noted [82]. These included narcissistic and exhibitionistic body image, depressions, major defects in early mothering, and ego pathology. These men had a preoccupation with their absent foreskins and represented a subgroup within the homosexual community [82]. Subsequently some skin-stretchers can now be found amongst heterosexuals, representing 10% of the 1,200 members of one 'uncirc' organization (cf. 80% homosexual and 10% bisexual), with 65% uncircumcised, 30% circumcised, and 5% partially circumcised. Although many were happy with the result (thus justifying to themselves the decision to undertake this ordeal), others disliked their new genital status, even choosing to undergo recircumcision [117].

Benefits outweigh the risks

Dr Tom Wiswell, a respected authority in the USA was a strong opponent, but then switched camps as a result of his own research findings and the findings of others. This is what he has to say: "As a pediatrician and neonatologist, I am a child advocate and try to do what is best for children. For many years I was an outspoken opponent of circumcision ... I have gradually changed my opinion" [149,150]. This ability to keep an open mind on the issue and to make a sound judgement on the balance of all available information is to his credit — he did change his mind!

Wiswell looked at the complication rates of having or not having it performed in a study of 136,000 boys born in US army hospitals between 1980 and 1985. 100,000 were circumcised and 193 (0.19%) had complications, with no deaths, but of the 36,000 who were not circumcised the complication rate was 0.24% and there were 2 deaths [156]. A study by others found that of the 11,000 circumcisions performed at New York's Sloane Hospital in 1989, only 6 led to complications, none of which were fatal [110]. An early survey saw only one death amongst 566,483 baby boys circumcised in New York between 1939 and 1951 [125]. (There are *no* deaths today.)

A retrospective study of boys aged 4 months to 12 years found significantly greater frequency of penile problems (14% vs 6%; $P < 0.001$) and medical visits for penile problems (10% vs 5%; $P < 0.05$) among those who were uncircumcised, compared with those who were circumcised [51]

Pain and memory

No adverse psychological aftermath has been demonstrated [112]. It must be recognised that there are many painful experiences encountered by the child before, during and after birth [79]. Circumcision, if performed without anaesthetic is one of these. Cortisol levels have registered an increase during and shortly after the procedure [131,132], indicating that the baby is not unaware of having had something painful done in its unanaesthetized state. Nevertheless, some babies show no signs of distress at all. Most do, however, and this may be contributed by the restraining procedure, as well as the surgery itself. In the past doctors and parents had to weigh up the need to inflict this short term pain in the context of a lifetime of gain from prevention or reduction of subsequent problems. However, today, effective anaesthetic procedures are available that make circumcision virtually pain-free. These will be discussed later.

Penile hygiene

The proponents of not circumcising nevertheless stress that lifelong penile hygiene is required. This acknowledges that something harmful or unpleasant is happening under the prepuce. Studies of middle class British [57,110] and Scandinavian [95] schoolboys concluded that penile hygiene, as such, is at best poor and at worst nonexistent. Furthermore, Dr Terry Russell, an Australian medical practitioner states 'What man after a night of passion is going to perform penile hygiene before rolling over and snoring the night away (with pathogenic organisms multiplying in the warm moist environment under the prepuce)' [110]. The bacteria start multiplying again immediately after washing and contribute, along with skin secretions, to the whitish film, termed 'smegma', that is found under the foreskin. Bacteria give off an offensive odour. Men differ in their sensitivity to this smell and some shower several times a day as a result. Some uncircumcised men, and/or their partners, find the stench so unpleasant that this smell has caused these men to seek a circumcision on this basis alone. For mothers and fathers, it is far easier to maintain cleanliness of their son's penis if it is circumcised. If their son isn't the messages are confusing: should they clean under the foreskin or leave it alone?

What motivates parents to get their baby boy circumcised and the rates

The reasons for circumcision, at least in a survey carried out as part of a study at Sydney Hospital, were: 3% for religious reasons, 1-2% for medical, with the remainder suggested by the researchers as 'to be like dad' or a preference of one or both parents for whatever reason [30]. The main reason may have more to do with hygiene and appearance, as will be discussed later in the section on socio-sexual aspects. The actual proportion of men who were circumcised when examined at this clinic was 62%. Of those studied, 95% were Caucasian, with younger men just as likely to be circumcised as older men. In Adelaide, South Australia, a similar proportion has been noted, with 55% of younger men being circumcised. In Britain, however, the rate is only 7-10%, much like Europe. Rates in Africa, Asia and India vary according to religion and culture, with higher rates amongst Muslims and certain tribes and low rates amongst other groups and nations. In the USA, as indicated above, the rate of circumcision has always been high, although differs in different regions: the rates for 1991, 1992, 1993 and 1994 in the northeast region were 62%, 68%, 65% and 70%, in each respective year; for the midwest they were 78%, 78%, 74% and 80%, respectively; for the southern region: 64%, 63%, 61% and 65%; and for the western region: 41%, 38%, 36% and 34% [88]. The actual rates are higher than indicated by this data, as they represent only the numbers reported, whereas not all are [44]. Even when they are supposed to be, they are often not listed on the medical record face sheet used in NCHS surveys, so that when the oversights were corrected in one study, infant circumcision rate increased from 75% to 89% [91].

In Canada the rate varies markedly between different regions. Even in the same province, Ontario, for example, the rate between different districts ranges from 2% to 70%, with a mean of around 50%. (Data from Ontario Ministry of Health and Statistics Canada, and Institute for Clinical Evaluative Sciences.)

Physical problems

Phimosis (inability to retract the foreskin) is normal in very young boys, but is gone by age 3 in 90%. If still present after age 6 it is regarded as a problem and affects 2-10% of uncircumcised males. The narrow foreskin opening causes urinary obstruction that can be partial or complete. Backward pressure to the kidney may impede its function and lead to high blood pressure, which is associated with increased risk of heart attack or stroke.

Paraphimosis (where the retracted foreskin cannot be brought back again over the glans) is a very painful problem, relieved by circumcision or slitting the dorsal surface of the foreskin.

To paediatric surgeons, the most obvious medical reasons for circumcision are balanitis (inflammation of the glans) and posthitis (inflammation of the foreskin), which are very painful conditions virtually limited to uncircumcised males. In babies, balanitis is caused by soiled diapers, playing and sitting in dirty areas, antibiotic therapy, as well as yeast and other micro-organisms. The incidence of balanitis is twice as high in uncircumcised boys [40,52] and is greater than 5-fold higher in uncircumcised adults [36]. Balanitis caused by the group A haemolytic variety of streptococcus is present exclusively in uncircumcised boys [93]. Balanoposthitis (inflammation of the foreskin and glans) is common in uncircumcised diabetic men owing to a weakened, shrunken penis [36] and such men also have more intercourse problems. Diabetes is common and inherited, so a family history of this disease may add to considerations about whether to circumcise at birth.

The foreskin of uncircumcised boys can become accidentally entrapped in zippers, resulting in pain, trauma, swelling and scarring of this appendage.

In elderly men, infections and pain from balanoposthitis, phimosis and paraphimosis are seen and carers report problems in achieving optimal hygiene in uncircumcised men. The need for an appliance for urinary drainage in quadriplegics and in senile men is facilitated if they are circumcised. Boys and men who are not circumcised can be a source of irritation if they do not retract the foreskin when they urinate, as 'splatter' will occur. Although not a medical problem, it is a source of annoyance for other people (such as a parent or partner) if it is they that have the job of cleaning the bathroom. Foreskin problems also mean intercourse is painful.

Another condition, *Frenular chordee*, results from an unusually thick and often tight frenulum and prevents the foreskin from fully retracting, being present in a quarter of all uncircumcised males [47]. The frenulum then tears during intercourse or masturbation. Since scar tissue is generally more fragile and less elastic than normal tissue, the tear often reoccurs causing pain, bleeding and the inability to have sexual relations. This problem can be solved by excising the frenulum during a circumcision. Frenoplasty (removing just the tight frenulum) is also possible.

Follow-up 5 years later of 117 boys circumcised for phimosis, balanitis scarring of the prepuce, or ballooning when urinating found that 95% expressed complete satisfaction and the only psychological effect was slight shyness in the school change-room in 9% of boys in this Swedish study [128,129]. The study showed that parents had nothing to fear for their son's psychological well-being from circumcision.

Neonatal urinary tract infections

In 1982 it was reported that 95% of UTIs in boys aged 5 days to 8 months were in uncircumcised infants [45]. This was confirmed by Wiswell [157] and a few years later Wiswell and colleagues found that in 5,261 infants born at one US Army hospital, 4% of UTI cases were in uncircumcised males, but only 0.2% in those who were circumcised [158]. Wiswell then went on to examine the records for 427,698 infants (219,755 boys) born in US Armed Forces hospitals from 1975-79 and found that the uncircumcised had an 11-fold higher incidence of UTIs [155]. During this decade the frequency of circumcision in the USA decreased from 84% to 74% and this decrease was associated with an increase in rate of UTI [159]. Reviews by others in the mid-80s concluded there was a lower incidence in circumcised boys [74,107]. The rate in girls was stable during the period it was increasing in boys, in whom circumcision was in a decline. In a 1993 study by Wiswell of 209,399 infants born between 1985 and 1990 in US Army hospitals world-wide, 1046 (496 boys) got UTI in their first year of life [156]. The number was equal for boys and girls, but was 10-times higher for uncircumcised boys. Among the uncircumcised boys younger than 3 months, 23% had bacteraemia, caused by the same organism responsible for the UTI. It should be noted that these studies gave figures for infants admitted to hospital for UTI, so that the actual rate would undoubtedly have been higher. The infection can travel up the urinary tract to affect the kidney and a higher rate of problems such as pyelonephritis and renal scarring (seen in 7.5% [148]) is reported in uncircumcised children [109,130]. These and other reports [e.g., 23,45,51,109,120,130] all point to the benefits of circumcision in reducing UTI.

Indeed, Wiswell performed a meta-analysis of all 9 studies that had been published up until 1992 and found that every one had found an increase in UTI in the uncircumcised [156]. The average was 12-fold higher and the range was 5 to 89-fold, with 95% confidence intervals of 11-14 [156]. Meta-analyses by others have reached similar conclusions.

In Australia, a relatively small study in Sydney involving boys under 5 years of age (mean 6 months) found that 6% of uncircumcised boys got a UTI, but only 1% of circumcised [22].

The benefit appears to extend beyond childhood and into adult life. In a study of men aged, on average, 30 years, and matched for race, age and sexual activity, the circumcised had a lower rate of UTI [124].

The fact that fimbriated strains of the bacterium *Escherichia coli* which are pathogenic to the urinary tract and pyelonephritogenic, have been shown to be capable of adhering to the foreskin, satisfies one of the criteria for causality [41,46,58,59,130,159,160]. Thus in infancy and childhood the prepuce becomes colonized with bacteria. Fimbriated strains of *Proteus mirabilis*, non-fimbriated *Pseudomonas*, as well as species of *Klebsiella* and *Serratia* also bind closely to the mucosal surface of the foreskin within the first few days of life [41,46,160]. Circumcision prevents such colonization and subsequent ascending infection of the urinary tract [107].

A recent report found that swabs were taken of the periurethral area (the region of the penis where urine is discharged) in 46 circumcised and 125 uncircumcised healthy males (mean age = 27; range = 2 to 54 years) showed a predominance of Gram positive cocci in both groups, facultative Gram negative rods in 17% of uncircumcised males, but in only 4% of circumcised ($P = 0.01$); streptococci, strict anaerobes (bacteria that can grow without oxygen) and genital mycoplasmas (bacteria that lack a cell wall) were found almost exclusively in uncircumcised males over the age of 15 years (82% of the study group) [119]. Since these organisms are common inhabitants of the female genital tract, acquisition via sexual transmission was suggested. These latter categories of bacteria, unlike the Gram positive cocci, are potential pathogens capable of causing UTIs. It was speculated that when Gram negative organisms are the only colonizers of the preputial space they achieve higher concentrations and that the quantitative difference may contribute to the development of UTI. The findings of this study provide a microbiological basis for the observed higher risk of UTI in uncircumcised adult men. The authors also concluded that their results pointed to a role for the prepuce as a reservoir for sexually transmitted organisms [119].

Since the absolute risk of UTI in uncircumcised boys is approx. 1 in 25 (0.05) and in circumcised boys is 1 in 500 (0.002), the absolute risk reduction is 0.048. Thus 20 baby boys need to be circumcised to prevent one UTI. However, the potential seriousness and pain of UTI, which can in rare cases even lead to death, should weigh heavily on the minds of parents. The complications of UTI that can lead to death are: kidney failure, meningitis and infection of bone marrow. The data thus show that much suffering has resulted from leaving the foreskin intact. Lifelong genital hygiene in an attempt to reduce such infections is also part of the price that would have to be paid if the foreskin were to be retained. However, given the difficulty in keeping bacteria at bay in this part of the body [95,115], not performing circumcision would appear to be far less effective than having it done in the first instance [115].

Sexually-transmitted diseases

In 1947 a study of 1,300 consecutive patients in a Canadian Army unit showed that being uncircumcised was associated with a 9-fold higher risk of syphilis and 3-times more gonorrhoea [147]. Work in the mid-70s showed higher chancroid, syphilis, papillomavirus and herpes in uncircumcised men [133]. At the University of Western Australia a 1983 study showed twice as much herpes and gonorrhoea, 5-times more candidiasis and 5-fold greater incidence of syphilis [97]. Others have reported higher rates of nongonococcal urethritis in uncircumcised men [123]. In South Australia a study in 1992 showed that uncircumcised men had more chlamidia (odds ratio 1.3) and gonococcal infections (odds ratio 2.1). Similarly in 1988 a study in Seattle of 2,800 heterosexual men reported higher syphilis and gonorrhoea in uncircumcised men, but no difference in herpes, chlamidia and non-specific urethritis (NSU). Like this report, a study in 1994 in the USA, found higher gonorrhoea and syphilis, but no difference in other common STDs [20]. In the same year Dr Basil Donovan and associates reported the results of a study of 300 consecutive heterosexual male patients attending Sydney STD Centre at Sydney Hospital [30]. They found no difference in genital herpes, NSU, seropositivity for HSV-2 and genital warts (i.e., the benign, so-called 'low-risk' human papillomavirus types 6 and 11, which are visible on physical examination, unlike the 'high-risk' types 16 and 18, which are not). As mentioned above, 62% were circumcised and the two groups had a similar age, number of partners and education. Gonorrhoea, syphilis and hepatitis B were too uncommon in this Sydney study for them to conclude anything about these other STDs. Similar findings were obtained in the National Health and Social Life Survey in the USA, which asked about gonorrhoea, syphilis, chlamidia, nongonococcal urethritis, herpes and HIV (which is more often acquired intravenously) [72], although some under-reporting by uncircumcised men was likely as they tended to be less educated. Also, circumcision at birth was assumed, so that the number who sought circumcision later in life for problems, such as STDs and/or other infections, and therefore had switched group, was not taken into account. Design aspects of a number of the studies have in fact

been criticised. As a result there is still no overwhelming agreement. Nevertheless, on the bulk of evidence it would seem that at least some STDs could be more common in the uncircumcised, but this conclusion is by no means absolute in western settings, and the incidence may be influenced by factors such as the degree of genital hygiene, availability of running water and socioeconomic group being studied. In some more recent studies in developed nations, in which hygiene is good, no difference was apparent.

Cancer of the penis

The incidence of penile cancer in the USA is 1 per 100,000 men per year (i.e., 750-1000 cases annually) and mortality rate is 25-33% [66,76]. It represents approximately 1% of all malignancies in men in the USA. This data has to be viewed, moreover, in the context of the high proportion of circumcised men in the USA, especially in older age groups, and the age group affected, where older men represent only a portion of the total male population. Thus 1 in 100,000 per year of life translates to 75 in 100,000 during each man's lifetime, but since it occurs almost entirely in uncircumcised men, if we assume that these represent 30% of males in the USA, the chance an uncircumcised man will get it would be 75 per 30,000 = 1 in 400. In a study in Melbourne in 1990, although 60% of affected men were over 60 years of age, 40% were under 60 [111]. In 5 major series in the USA since 1932 [161], not one man with penile cancer had been circumcised neonatally [76], i.e., this disease is almost completely confined to uncircumcised men and, less commonly, in those circumcised after the newborn period. In fact penile cancer is so rare in a circumcised man, that when it does occur it can be the subject of a published case report [60]. The finite residual risk in those circumcised after the newborn period is the major contributing factor to estimates of lifetime risk in the total population of circumcised men of 1 in 50,000 to 1 in 12,000,000 [151,152]. Overall there have been 50,000 cases of penile cancer in the USA since the early 1930s and these resulted in 10,000 deaths. Only 10 of these cases were in circumcised men [114], and, as indicated, these had been circumcised later in life. The predicted life-time risk for an uncircumcised man has been estimated as 1 in 600 in the USA and 1 in 900 in Denmark [66]. In Denmark (circumcision rate = 2%), penile cancer has been decreasing steadily [39] in parallel with an increase in indoor bathrooms. Urban unmarried men were more likely to get it. Since the rate of penile cancer in Denmark is lower than in the USA other factors besides circumcision are also at work in these climatically, genetically and culturally different countries. The statistics for Denmark have been used by anti-circs to draw a sweeping and fallacious conclusion about lack of circumcision *per se* in penile cancer. The Danish themselves have concluded that although their uncircumcised men are at lower risk, this is only 1 in 900 as opposed to 1 in 600 in the USA, as stated above [66].

In underdeveloped countries the incidence is higher: approx. 3-6 cases per 100,000 per year [66]. In those underdeveloped countries where circumcision is not routinely practiced it can be ten times more common than in developed countries, representing 11% to 12% of all male cancers [87]. In Uganda it is the most common malignancy in males, leading to calls for greater circumcision in that country [29].

In Australia, figures from the New South Wales Cancer Council (for 1993) show 28 cases per year (including one in a child), with 5 deaths, which is similar to the 1 in 100,000 figure above and applies to a population in which the majority of the older men are circumcised. The rate could be set to escalate, however, as more of the males who were not circumcised during the period after the mid 1970s reach the ages when this cancer generally begins to appear.

The so-called 'high-risk' human papillomavirus types 16 and 18 (HPV 16/18) are found in a large proportion of cases and there is good reason to suspect that they are involved in the causation of penile cancer [78], as is true for most, if not all, cases of cervical cancer (see below). HPV 16 and 18 are, moreover, more common in uncircumcised males [90]. These types of HPV produce flat warts that are normally only visible by application of dilute acetic acid (vinegar) to the penis and the data on high-risk HPVs should not be confused with the incidence figures for genital warts, which although large and readily visible, are caused by the relatively benign HPV types 6 and 11 [62]. 93% of men whose female partner was positive for early signs of cervical cancer (cervical intraepithelial neoplasia, CIN) had the male equivalent, penile intraepithelial neoplasia (PIN) [8]. Oncogenic HPV was present in 75% of patients with PIN grade I, 93% with PIN grade II and 100% of PIN grade III, which is one step before penile cancer itself [8]. Moreover, the rate of PIN was 10% in uncircumcised men cf. only 6% in circumcised men [8]. Other factors, such as smoking, poor hygiene and other STDs have been suspected as contributing to penile cancer as well [14,76], but it would seem that lack of circumcision is the primary prerequisite, with such other factors adding to the risk in the uncircumcised man. Financial considerations are, moreover, not inconsiderable. In the USA it was estimated that the cost for treatment and lost earnings in a man of 50 with cancer, even in 1980, was \$103,000 [49]. The amount today is very much higher.

In Australia between 1960 and 1966 there were 78 deaths from cancer of the penis and 2 from circumcision. (Circumcision fatalities today are virtually unknown.) At the Peter McCallum Cancer Institute 102 cases of penile cancer were seen between 1954 and 1984, with twice as many in the latter decade compared with the first. Moreover, several authors have linked the rising incidence of penile cancer to a decrease in the number of neonatal circumcisions [24,111]. It would thus seem that "prevention by circumcision in infancy is the best policy". Indeed it would be an unusual parent who did not want to ensure their child was completely protected by this simple procedure.

Prostate cancer

Prostate cancer accounts for 27% of new cancers in males and 7% of deaths [89]. Uncircumcised men have twice the incidence of prostate cancer compared with circumcised [5,35], and this cancer is rare amongst Jews [2]. No association has been seen between rate of prostate cancer and rate of cervical cancer in different geographic localities [108]. However, in a study of 20,243 men in Finland, infection with HPV18 was associated with a 2.6-fold increase in risk of prostate cancer ($P < 0.005$) [28]. For HPV16 the increased risk was 2.4-fold.

Cervical cancer in female partners of uncircumcised men

A number of studies have documented higher rates of cervical cancer in women who have had one or more male sexual partners who were uncircumcised. These studies have to be looked at critically, however, to see to what extent cultural and other influences might be contributing in groups with different circumcision practices. Premarital sex is uncommon in the various religious groups in India and surrounding countries. In a study of 5,000 cervical and 300 penile cancer cases in Madras between 1982 and 1990 the incidence was low amongst Muslim women, when compared with Hindu and Christian, and was not seen at all in Muslim men [42]. In a case-control study of 1,107 Indian women with cervical cancer, sex with uncircumcised men or those circumcised after the age of 1 year was reported in 1993 to be associated with a 4-fold higher risk of cervical cancer, after controlling for factors such as age, age of first intercourse and education [1]. Another study published in 1993 concerning various types of cancer in the Valley of Kashmir concluded that universal male circumcision in the majority community was responsible for the low rate of cervical cancer compared with the rest of India [25]. In Israel, a 1994 report of 4 groups of women aged 17-60 found that Moshav residents with no gynaecological complaints had no HPV 16/18 and healthy Kibbutz residents had a 1.8% incidence [55]. Amongst those who had a gynaecological complaint HPV 16/18 was found in 9% of Jewish and 12% of non-Jewish women. Thus the causative agent (high-risk HPV) can be found in Jewish women. The source of this (circumcised vs. uncircumcised partners) was not explored.

So-called 'high-risk' HPV types 16, 18 and some rarer forms are responsible for virtually every case cervical of cervical cancer [139]. These same high-risk HPVs also cause penile intraepithelial neoplasia (PIN). In a study published in the *New England Journal of Medicine* in 1987 it was found that women with cervical cancer were more likely to have partners with PIN, the male equivalent of cervical intraepithelial neoplasia (CIN) [11]. A study in 1994 found that in women with CIN, PIN was present in the male partner in 93% of cases [8]. CIN may lead to cancer or, more often, it goes away. Thus co-factors are suspected. Interestingly, smegma (the film of bacteria, secretions and other material under the foreskin), obtained from human and horse has been shown to be capable of producing cervical cancer in mice in one study [101], but not in another [106]. Thus the epidemic of cervical cancer in Australia, and indeed most countries in the world, would appear to be contributed, at least in part, by the uncircumcised male and would therefore be expected to get even worse as the large proportion of men that were born in the past 10-20 years and not circumcised reach sexual maturity.

AIDS virus

In the USA the estimated risk of HIV per heterosexual exposure is 1 in 10,000 to 1 in 100,000. If one partner is HIV positive and otherwise healthy then a single act of unprotected vaginal sex carries a 1 in 300 risk for a woman and as low as a 1 in 1000 risk for a man [17]. (The rates are very much higher for unprotected anal sex and intravenous injection). In Africa, however, the rate of HIV infection is up to 10% in some cities. (A possible reason for this big difference will be discussed later.) In Nairobi it was first noticed that among 340 men being treated for STDs they were 3-times as likely to be HIV- positive if they had genital ulcers or were uncircumcised

(11% of these men had HIV) [122]. Subsequently another report showed that amongst 409 African ethnic groups spread over 37 countries the geographical distribution of circumcision practices indicated a correlation of lack of circumcision and high incidence of AIDS [13]. In 1990 Moses in the *International Journal of Epidemiology* reported that amongst 700 African societies involving 140 locations and 41 countries there was a considerably lower incidence of HIV in those localities where circumcision was practiced [85,86]. Truck drivers, who generally exhibit more frequent prostitute contact, have shown a higher rate of HIV if uncircumcised. Interestingly, in a West African setting, men who were circumcised but had residual foreskin were more likely to be HIV-2 positive than those in whom circumcision was complete [99].

Of 33 cross-sectional studies, 22 have reported statistically significant association [e.g., 26,27,54,56,102,136], by univariate and multivariate analysis, between the presence of the foreskin and HIV infection (4 of these were from the USA). 5 reported a trend (including 1 US study) [84,86]. The 6 that saw no difference were 4 from Rwanda and 2 from Tanzania. In addition there have been 5 prospective studies and 2 from Kenya and 1 from Tanzania reported statistically significant association. The increased risk in the significant studies ranged from 1.5 to 9.6. One study, in 1998 from Dar es Salaam, Tanzania, where most men are circumcised, noted that married women, with one sex partner, had a 4-fold higher relative risk of HIV if their husband was uncircumcised [61].

The findings have, moreover, led various workers, Moses and Caldwell included, to propose that circumcision be used as an important intervention strategy in order to reduce AIDS [17,38,54,64,77,85,86]. Such advice has been taken up, with newspaper advertisements from clinics in Tanzania offering this service to protect against AIDS.

Perhaps the most interesting study of the risk of HIV infection imposed by having a foreskin is that by Cameron, Plummer and associates published as a large article in *Lancet* in 1989 [18]. It was conducted in Nairobi. Rather than look at the existing infection rate in each group, these workers followed HIV negative men until they became infected. The men were visiting prostitutes, numbering approx. 1,000, amongst whom there had been an explosive increase in the incidence of HIV from 4% in 1981 to 85% in 1986. These men were thus at high risk of exposure to HIV, as well as other STDs. From March to December 1987, 422 men were enrolled into the study. Of these, 51% had presented with genital ulcer disease (89% chancroid, 4% syphilis, 5% herpes) and the other 49% with urethritis (68% being gonorrhoea). 12% were initially positive for HIV-1. Amongst the whole group, 27% were not circumcised. They were followed up each 2 weeks for 3 months and then monthly until March 1988. During this time 8% of 293 men seroconverted (i.e., 24 men), the mean time being 8 weeks. These displayed greater prostitute contact per month (risk ratio = 3), more presented with genital ulcers (risk ratio = 8; $P < 0.001$) and more were uncircumcised (risk ratio = 10; $P < 0.001$). Logistic regression analysis indicated that the risk of seroconversion was independently associated with being uncircumcised (risk ratio = 8.2; $P < 0.0001$), genital ulcers (risk ratio = 4.7; $P = 0.02$) and regular prostitute contact (risk ratio = 3.2; $P = 0.02$). The cumulative frequency of seroconversion was 18% and was only 2% for men with no risk factors, compared to 53% for men with both risk factors. Only one circumcised man with no ulcer seroconverted. Thus 98% of seroconversion was associated with either or both cofactors. In 65% there appeared to be additive synergy, the reason being that ulcers increase infectivity for HIV. This involves increased viral shedding in the female genital tract of women with ulcers, where HIV-1 has been isolated from surface ulcers in the genital tract of HIV-1 infected women. In this African study the rate of transmission of HIV following a single exposure was 13% (i.e., very much higher than in the USA). It was suggested that concomitant STDs, particularly chancroid [17], may be a big risk factor, but there could be other explanations as well.

It was suggested that the foreskin could physically trap HIV-infected vaginal secretions and provide a more hospitable environment for the infectious inoculum. Also, the increased surface area, traumatic physical disruption during intercourse and inflammation of the glans penis (balanitis) could aid in recruitment of target cells for HIV-1. The port of entry could potentially be the glans, subprepuce and/or urethra. In a circumcised penis the drier, cornified skin may prevent entry and account for the findings. The inner lining of the foreskin is relatively 'immune deficient', with only 8 of the immune-protective Langerhan's cells per square millimetre in the uncircumcised cf. 174 on the external surface of the foreskin, as for other exposed skin on the penis and body in general [141].

Studies in the USA have not been as conclusive. Some studies have shown a higher incidence in uncircumcised men [145]. But in one in New York City, for example, no significant correlation was found, but the patients were mainly intravenous drug users and homosexuals, so that any existing effect may have been obscured. A study in Miami, however, of heterosexual couples did find a higher incidence in men who were uncircumcised, and, in Seattle homosexual men were twice as likely to be HIV positive if they were uncircumcised [67].

In an editorial review in 1994 of 26 studies it was pointed out that more work was needed in order to reduce potential biases in some of the previous data [26]. At least one study since then has controlled for such potential confounding factors, confirming a significantly lower HIV prevalence among circumcised men [136].

The sorts of health problems faced by the 'third-world', coupled with a lack of circumcision may account for the rapid spread of HIV through Asia [144]. The reason for the big difference in apparent rate of transmission of HIV in Africa and Asia, where heterosexual exposure has led to a rapid spread through these populations and is the main method of transmission, compared with the very slow rate of penetration into the heterosexual community in the USA and Australia, could be related at least in part to a difference in the type of HIV-1 itself [68]. In 1995 an article in *Nature Medicine* discussed findings concerning marked differences in the properties of different HIV-1 subtypes in different geographical locations [94]. A class of HIV-1 termed 'clade E' is prevalent in Asia and differs from the 'clade B' found in developed countries in being highly capable of infecting Langerhans cells found in the foreskin, so accounting for its ready transmission across mucosal membranes. The Langerhans cells are part of the immune system and in turn carry the HIV to the T-cells, whose numbers are severely depleted as a key feature of AIDS. The arrival of the Asian strain in Australia was reported in Nov 1995 and has the potential to utilize the uncircumcised male as a vehicle for rapid spread through the heterosexual community of this country in a similar manner as it has done in Asia. It could thus be a time-bomb waiting to go off and should be a major concern for health officials.

Sexual transmission of HIV and other STDs would be reduced by use of barrier protection such as condoms. Despite the campaigns, passion will over-ride compliance on occasions in the most sexually promiscuous, at-risk group, who are at an age when risk-taking behaviour is prevalent (cf. smoking in young people vis-a-vis the anti-smoking campaign), with tragic consequences. Many young people do not use condoms and openly scoff at the idea, despite the health warnings. Indeed it may be a sign of machismo to the young adult. Thus education is only part of the answer and where an additional simple procedure is available to reduce the risk, then logic dictates that it should be used. The result will be many lives saved.

Socio-sexual aspects

In the setting of Australia, perhaps the first, albeit small and restricted, but interesting survey of circumcised vs uncircumcised men and their partners was conducted by Sydney scientist James Badger [9,10] (who regards himself as neutral on the issue of circumcision). It involved responses to a questionnaire published in *Australian Forum* magazine or placed in Sydney clinics of the Family Planning Association of New South Wales. There were 180 participants (79 male, 101 female) who were aged 15-60. The women were mainly (50%) in the 20-30 year-old age group cf. 25% of the men, more of whom (33%) were aged 30-40. It found that:

- 18% of uncircumcised males underwent circumcision later in life anyway.
- 21% of uncircumcised men who didn't, nevertheless wished they were circumcised. (There were also almost as many men who wished they hadn't been circumcised and it could be that at least some men of either category may have been seeking a scapegoat for their sexual or other problems. In addition, this would no doubt be yet another thing children could blame their parents for, whatever their decision was when the child was born.)
- No difference in sexual performance (consistent with Masters & Johnson).
- Slightly higher sexual activity in circumcised men.
- No difference in frequency of sexual intercourse for older uncircumcised vs. circumcised men.
- Men circumcised as adults were very pleased with the result. The local pain when they awoke from the anaesthetic was quickly relieved by pain killers (needed only for one day), and all had returned to normal sexual relations within 2 weeks, with *no decrease in sensitivity* of the penis and claims of 'better sex'. (Badger's findings are, moreover, consistent with every discussion the author has ever had with men circumcised as adults, as well as email received from a number of such men. The only cases to the contrary were a testimonial in a letter I received from a member of UNCIRC and a very brief email message that didn't say why.)

- Women with circumcised lovers were more likely to reach a simultaneous climax (29% vs. 17% of the study population grouped across the orgasmic spectrum of boxes for ticking labelled 'together', 'man first', 'man after' and 'never come'; some ticked more than one box).

- Women who failed to reach an orgasm were 3 times more likely to have an uncircumcised lover.

(These data could, however, possibly reflect behaviours of uncircumcised males that might belong to lower socio-economic classes and/or ethnic groups whose attitudes concerning sex and women may differ from the better educated groups in whom circumcision is more common.)

- Circumcision was favoured by women for appearance and hygiene. (Furthermore, some women were nauseated by the smell of the uncircumcised penis, where, as mentioned earlier bacteria and other micro-organisms proliferate under the foreskin.)

- The uncircumcised penis was found by women to be easier to elicit orgasm by hand.

- The circumcised penis was favoured by women for oral sex (fellatio).

These findings are consistent with later studies. In a survey of new mothers, hygiene and appearance were the two major reasons for choosing to have their newborn son circumcised [146]. There was a strong correlation between their son's circumcision status and the woman's ideal male partner's circumcision status for intercourse. Thus by being circumcised they thought that their sons would likewise be more attractive to a future sexual partner (with the implication that they would be at an advantage in passing on their, and therefore the mother's, genes to the subsequent generation). Their own preference thus affected their choice for their sons. 92% said the circumcised penis was cleaner, 90% said it looked 'sexier', 85% it felt nicer to touch and 55% smelled more pleasant. Even women who had only ever had uncircumcised partners preferred the look of the circumcised penis. Only 2% preferred an uncircumcised penis for fellatio, with 82% preferring the circumcised variety. Preference for intercourse for circ. vs uncirc. was 71% vs 6%, respectively; manual stimulation, 75% vs 5%; visual appeal, 76% vs 4%. What then is sexier about a circumcised penis? Quite likely it is that the glans is exposed in both the erect and unerect state. American producers of erotic films and publishers of photographic works choose circumcised men, or at least uncircumcised men whose foreskin is smooth and free from loose, wrinkled skin, as the latter lacks visual appeal, especially to those who are not used to seeing an uncircumcised penis. For example, 'Elaine', in an episode of the TV sitcom 'Seinfeld' stated that "[the uncircumcised penis] looks like an alien!"

As far as sex is concerned, the National Health and Social Life Survey (NHSL) in the USA found that uncircumcised men were more likely to experience sexual dysfunctions [72]. This was slight at younger ages, but became quite significant later in life and included finding it twice as difficult to achieve or maintain an erection. It was also discovered that circumcised men engaged in a more elaborate set of sexual practices. Not surprisingly, in view of the findings above, circumcised men received more fellatio. However, they also masturbated more, a finding that, ironically, contradicts the apparent wisdom in Victorian times that circumcision would reduce the urge to masturbate. (Contrary to anti-circ. propaganda, circumcision was not used to reduce masturbation, but rather to prevent smegma and itching, so stopping males scratching their genitalia, which co-incidentally sometimes led to arousal). As noted in other studies, circumcision rates were greatest among whites and those who were better-educated, reflecting their exposure to and ability to evaluate and respond to scientific information about circumcision. There was little difference between different religious groups.

In Britain a class distinction is associated with circumcision, with the Royal Family and the upper classes being circumcised and the lower classes generally not. The NHSL in the USA saw greatest rates among whites and the better educated. There was little difference between different religious groups. Some ancient cultures and some even today practice infibulation (drawing a ring or similar device through the prepuce or otherwise occluding it for the principal purpose of making coition impossible) [118]. This is the opposite of circumcision. It was, moreover, espoused in Europe and Britain in previous centuries as a way of reducing population growth amongst the poor and to prevent masturbation [118].

Consistent with the accounts above of men circumcised as adults, clinical and neurological testing has not detected any difference in penile sensitivity between men of each category [159,160]. Sexual pleasure also appears to be the same.

The procedure itself

Circumcision of the neonate: There is no evidence of any long-term psychological harm arising from circumcision. The risk of damage to the penis is extremely rare and avoidable by using a competent, experienced doctor. Unfortunately, because it is such a simple, low-risk procedure, it had been the practice to assign this job to junior medical staff and nurses, with occasional devastating results. Parents or patients need to have some re-assurance about the competence of the operator. Also the teaching of circumcision to medical students and practitioners needs to be given greater attention because it is so commonly performed and needs to be done well. Surgical methods often use a procedure that protects the penis during excision of the foreskin. The most commonly used devices are the GOMCO clamp, MOGEN clamp and PlastiBell. The latter clamps the foreskin, which then falls off after a few days, and so eliminates the need to actually cut the foreskin off [43]. However, some of these more elaborate methods take up to 15-30 min to perform and therefore expose the baby to a greater period of discomfort. Circumcision can be completed in 15-30 seconds by a competent practitioner using more traditional approaches. Rather than tightly strapping the baby down, swaddling and a pacifier has been suggested [50,151-153]. A special padded, 'physiological' restraint chair has moreover been devised and shown to reduce distress scores by more than 50% [126]. Dr Tom Wiswell strongly advocates the neonatal period as being the best time to perform circumcision, pointing out that the child will not need ligatures or general anaesthesia, nor additional hospitalization [151-153]. Without an anaesthetic the child experiences pain and pain is also present for from a few up to a maximum of 12-24 hours afterwards. The child does not, however, have any long term memory of having been circumcised. A greater responsiveness to subsequent injection for routine immunization may, however, suggest the baby could remember for a short time [132]. Anaesthesia is therefore advocated (see below). Complication rate is very low (0.2%), as is cost (discussed later).

Children: For children aged 4 months to 15 years a general anaesthetic is generally used and this carries a small risk. Also, ligatures are usually needed. Recently, excellent cosmetic results were reported for all of 346 patients aged 14 to 38 months using electrosurgery, which presents a bloodless operative field [100]. Metal of any kind (such as the Gomco clamp) have to of course be avoided in this procedure. Circumcision later obviously requires a separate (often overnight) visit to hospital. Rate of complications is also greater, but still low (1.7%). Pain lasts for days afterwards and those older than 1-2 years may remember. Cost is also much greater. In adults it may be even more expensive, but can be performed on an outpatient basis, sometimes with local anaesthetic, and pain can last for a week or so, during which time absence from work is required.

Thus when considering when is the best time, it would appear that circumcision in the newborn period is safe and technically easy. It is also cheap, as discussed in the next section.

Anaesthesia

Anaesthesia for circumcision is recommended [103]. Dorsal penile nerve block [65] represents 85% of anaesthetic use in the USA [127]. Ring block, which had initially been used for postcircumcision analgesia [15], is simpler, and extremely effective [48,70]. In fact this method seems to be the best. Pain from the infiltration of a local anaesthetic is short-lived and significantly less than the pain from an unanaesthetized circumcision [71]. EMLA cream (5% lidocaine/prilocaine; Astra) [132,151-153] reduces pain during circumcision [131,132], and blood sampling in newborn babies [104], but is less effective than the others [16,70]. Total pain control can be achieved by a general anaesthetic. This can be given routinely for very young children, and if done in a children's hospital there is virtually no risk. However, because the operation is so trivial, local anaesthesia is all that is required. For a minority of people the way the circumcision is performed will obviously be dictated by their cultural or religious beliefs.

For some circumcisions, cultural or religious beliefs dictate the method. It is, moreover, acknowledged that the traditional bris might be less traumatic than common institutional approaches [71]. Jewish Mohelim take 10 seconds, with 1 second for excision, postoperative and 60 seconds on average for crying; since there is no crushing of tissue the pain is claimed to be not as severe as techniques used by doctors [121].

Despite the benefits of anaesthesia, many male newborn circumcisions in North America do not involve anaesthetics and this can be as much as 64-96% in some regions

[135,143]. In the USA 84% of paediatric, 80% of family practice and 60% of obstetric programs teach anaesthesia/analgesia techniques [53]. "Given the overwhelming evidence that neonatal circumcision is painful and the evidence of safe and effective anaesthesia/analgesia methods, residency training in neonatal circumcision should include instruction of pain relief techniques" [53].

Cost

In Australia, circumcision is amongst the 40 most frequently performed surgical procedures, occurring more commonly than tooth extraction [7]. For example, in 1992-1993, 14,604 neonatal circumcisions were performed at a cost to Medicare of A\$380,000. Interestingly, in 1985 the Federal Minister for Health removed the rebate for newborn circumcision from the Medical Benefits Schedule in response to the [now outmoded] 1983 recommendations of the National Health & Medical Research Council (NHMRC) of Australia. It was then quickly restored after a public outcry. The scheduled fee is only A\$34.10 [80]. Many doctors consider that the fee should be higher in Australia, as such a low fee has the potential to cause some doctors to discourage it based on nonmedical considerations.

In the USA, cost is US\$89-204, being cheaper in the midwest and more expensive on the east coast. On average the amount per circumcision across all ages versus mean lifetime medical costs in those not circumcised works out about the same [73]. In this analysis it was stated that if the rate of surgical complications from circumcision was less than 0.6% or if risk of penile problems in uncircumcised males exceeded 17% (cf. current baseline of 14%) then circumcision would be preferred on a cost and lifespan basis [73].

Whose responsibility?

It is argued by opponents of circumcision that the male himself should be allowed to make the decision about whether he does or does not want to be circumcised. However, there are problems with this argument, not the least of which is the fact that the greatest benefits accrue the earlier in life the procedure is performed. If left till later ages the individual has already been exposed to the risk of urinary tract infections, the physical problems and carries a residual risk of penile cancer. Moreover, it would take a very street-wise, outgoing, adolescent male to make this decision and undertake the process of ensuring that it was done. Most males in the late teens and 20s, not to mention many men of any age, are reticent to confront such issues, even if they hold private convictions and preferences about their penis. Moreover, despite having problems with this part of their anatomy, many will suffer in silence rather than seek medical advice or treatment. Really though parental responsibility must override arguments based on 'the rights of the child'. Think what would happen if we allowed children to reach the age of legal consent in relation to, for example, immunization, whether they should or should not be educated, etc, etc. A period of great benefit would have been lost, to the potential detriment of the person concerned. Parents have the legal right to authorize surgical procedures in the best interests of their children [4,34]. For them to make this decision medical practitioners are obliged to disclose to them fully and objectively ALL information relating to circumcision. This includes benefits and risks, prognosis and alternative methods.

Risks

Having described the benefits, let's look at the risks. As listed in [151-153], these are:

- *Excessive bleeding*: Occurs in 1 in 1000 — treated with pressure or locally-acting agents, but 1 in 4000 may require a ligature and 1 in 20,000 need a blood transfusion because they have a previously unrecognized bleeding disorder. Haemophilia in the family is of course a contra-indication for circumcision.
- *Infection*: Local infections occur in 1 in 100-1,000 and are easily treated with local antibiotics. Systemic infections may appear in 1 in 4,000 and require intravenous or intramuscular injection of antibiotics.
- *Subsequent surgery*: Needed for 1 in 1,000 because of skin bridges, or removal of too much or too little foreskin. Repair of injury to penis or glans required for 1 in 15,000. Loss of entire penis: 1 in 1,000,000, and is avoidable by ensuring the practitioner performing the procedure is competent. Injuries (rare) can be repaired [12] and in the infinitely remote instance of loss of the penis it can be reattached surgically [96].
- *Local anaesthetic*: The only risk is when the type of anaesthetic used is a dorsal penile nerve block, with 1 in 4 having a small bruise at the injection site. This will disappear.
- *Death*: The records show that between 1954 and 1989, during which time 50,000,000 circumcisions were performed in the USA there were only 3 deaths. (But there were 11,000 from penile cancer, a disease essentially confined to the uncircumcised [152].)

Why are human males born with a foreskin?

One function of the foreskin was probably to protect the head of the penis from long grass, shrubbery, etc when humans wore no clothes, where evolutionarily our basic physiology and psychology are little different than our cave-dwelling ancestors. Also, the moist tip would facilitate quick penetration of a female, where lengthy fore-play and intercourse would be a survival disadvantage, since the risk to the copulators from predators and human enemies would be greater the longer they were engaged in sex. Dr Guy Cox from The University of Sydney has recently suggested that the foreskin could in fact be the male equivalent of the hymen, and served as an impediment to sexual intercourse in adolescent primate humans before the advent in our species of civilization and cultures [21]. Way back then the foreskin would have reduced 'successful' sexual acts in those too young to adequately care for any offspring that might arise. With civilization control of the sexual behaviour of the young by society made the physical mechanism redundant and society introduced circumcision to be free the individual from the impediment of having a foreskin. Interestingly, the physical difficulties experienced by the uncircumcised may explain why the word for uncircumcised in Hebrew means 'obstruction' or 'to impede', so explaining the Biblical term 'uncircumcised heart' when referring to obstructionism.

What caused many cultures to ritually remove it?

There are several theories and each may have elements of truth. As mentioned above, according to Cox, the ritual removal of the foreskin in diverse human traditional cultures, ranging from Muslims to Aboriginal Australians could be a sign of civilization in that human society acquired the ability to control, through education and religion, the age at which sexual intercourse could begin.

Another compelling explanation involves the ritualization of circumcision's prophylactic effects, especially as many different human groups and cultures that live in desert or other hot environments have adopted it as part of their customs. Infections, initiated by the aggravation of dirt and sand, are not uncommon under such conditions and have even crippled whole armies, where it is difficult to achieve sanitation during prolonged battle. Historically it was not uncommon for soldiers to be circumcised in preparation for active service. The Judeo-Muslim practice of circumcision quite likely had its origin in Egyptian civilization, where there is evidence of a circumcised mummy at the time the Hebrews inhabited Egypt [105], as well as illustrations of the operation itself and of circumcised Pharaohs, dating back to 3000 BC [142]. One possible reason the Egyptians could have circumcised themselves and their slaves might have been to prevent schistosomal infection [142]. Urinary tract obstruction and haematuria are common in localities such as the Nile Valley that are inhabited by the blood fluke, *Schistosoma haematobium*, and the foreskin would undoubtedly possess the adverse ability of being able to hold water infected with the cercaria stage of the life cycle of this parasite and so facilitate its entry into the body. The perpetuation of the procedure by the Jews may have subsequently been driven by a desire to maintain cleanliness in an arid, sandy desert environment. Such considerations could also explain why it is practiced in multiple other cultures that live in such conditions. In each instance, the original practical reason became lost as the ritual persisted as a religious rite in many of the various cultures of the world. In the Muslim religion circumcision occurs in childhood and the age can be variable.

I have some wonderful photographs of a group of Masai boys in their early teens that I met in Kenya in 1989 dressed in their dark circumcision robes, with white feathers as headwear, and white painted facial decoration that stood out against their very black skin. Each wore a pendant that was the razor blade used for their own circumcision. The ceremony that they had gone through is a special part of their tribal culture and was very important to these boys, who were proud to show that they were now 'men'. In other cultures it is associated with preparation for marriage and as a sign of entry into manhood.

Interestingly, in Japan, which, like most of Asia, is traditionally a noncircumcising nation, circumcision has recently started to become a fashion amongst young men. The procedure is currently being promoted by way of articles and advertisements in the vast array of 'girlie', sex magazines read by young males. The message is that it improves hygiene and attractiveness to women.

To summarize:

Lack of circumcision:

- Is responsible for a 12-fold higher risk of urinary tract infections. Risk = 1 in 20.
- Carries a higher risk of death in the first year of life (from complications of urinary tract infections: viz. kidney failure, meningitis and infection of bone marrow).
- One in ~400-900 uncircumcised men will get cancer of the penis. A quarter of these will die from it and the rest will require at least partial penile amputation as a result. (In contrast, penile cancer *never occurs or is infinitesimally rare* in men circumcised at birth). (Data from studies in the USA, Denmark and Australia, which are not to be confused with the often quoted, but misleading, annual incidence figures of 1 in 100,000).
- Is associated with balanitis (inflammation of the glans), posthitis (inflammation of the foreskin), phimosis (inability to retract the foreskin) and paraphimosis (constriction of the penis by a tight foreskin). Up to 18% of uncircumcised boys will develop one of these by 8 years of age, whereas all are unknown in the circumcised. Risk of balanoposthitis = 1 in 6. Obstruction to urine flow = 1 in 10-50.
- Means problems that may result in a need for circumcision later in life. Also, the cost can be 10 times higher for an adult.
- Is the biggest risk factor for heterosexually-acquired AIDS virus infection in men. 8-times higher risk by itself, and even higher when lesions from STDs are added in. Risk per exposure = 1 in 300.
- Is associated with higher incidence of cervical cancer in the female partners of uncircumcised men.

Getting circumcised will result in:

- Having to go through a very minor surgical procedure that carries with it small risks.
- Improved hygiene.
- Lower risk of urinary tract infections.
- Less chance of acquiring AIDS heterosexually.
- Almost complete elimination of the risk of penile cancer.
- More favourable hygiene for the man and his sexual partner.
- Better sexual function on average.
- A penis that is regarded by most as being more attractive.

Conclusion

The information that appears in this review should prove informative to medical practitioners and health workers and thereby enhance the quality of information that is conveyed to parents of male children and to adult men. It should also prove to have educational value to others, especially the parents of boys, but also adult men, whether circumcised or not. It is hoped that as a result of reading the information presented here the choice that has to be made concerning circumcision, especially of male infants, is much more informed. Although there are benefits to be had at any age, they are greater the younger the child. Issues of 'informed consent' may be analogous to those parents have to consider for other medical procedures, such as whether or not to immunize their child. The question to be answered is 'do the benefits outweigh the risks'. When considering each factor in isolation there could be some difficulty in choosing. However, when viewed as a whole, in my opinion the answer to whether to circumcise a male baby is 'YES'. Nevertheless, everybody needs to weigh up all of the pros and cons for themselves and make their own best decision. I trust that the information I have provided in this article will help in the decision-making process.

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New book: "In Favour of Circumcision" by Dr Brian Morris, published by University of New South Wales Press, 1999, ISBN 0-86840-537-X (104 pages). This book expands on the information in this website and includes much new material, including many personal stories from men circumcised as adults, as babies and who are uncircumcised. You can order a copy from the publisher, [UNSW Press](http://www.unswpress.com.au). You can order copies of the book via the UNSW Press website, or by phone, using credit card details, on 61-2-9664 0999 or by faxing this

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