

# **Physical, Sexual and Psychological Effects of Male Infant Circumcision: an Exploratory Survey**

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## **1. INTRODUCTION**

The idea that routine infant circumcision is a benign or even beneficial procedure persists in some sections of Australian society despite a widely accepted range of consequences occurring as a result of most types of surgery. These outcomes relate to changes in how patients perceive their body and changes in actual bodily function.<sup>1</sup> Current knowledge on the long-term consequences of neonatal circumcision relies mostly on reports from self-selected men of the physical, sexual and psychological harm attributed to being circumcised.<sup>2,3,4,5,6,7</sup>

In view of this ongoing controversy, there is evidently need to document more fully the long-term physical, sexual and psychological impact of infant circumcision.

### **1.1 Anatomy and Function of the Male Foreskin**

The foreskin or prepuce, is the loose retractable skin sheath covering the distal end of the male penis or female clitoris.<sup>8</sup> It is a complex, two-part organ consisting of an outer, penile skin layer and an inner lining of highly sensitive mucous membrane.<sup>9</sup> Previously, Taylor, Lockwood, and Taylor noted that the innervation of the outer skin of the prepuce was “impressive,”

the authors remarking on its “sensitivity to light touch” and described the inner foreskin as tissue analogous to the epithelium which lines the mouth, vagina and esophagus.<sup>10</sup>

Important functions of the foreskin have been highlighted<sup>11,12</sup> and others may yet become apparent. Functions of the foreskin listed by Fleiss<sup>13</sup> and Harryman<sup>14</sup> include:

1. Protection of the glans through emollients that maintain the surface of the glans penis.
2. Immune response: the soft mucosa of the foreskin contains plasma cells, which secrete antibodies, and pathogen-killing enzymes such as lysozymes.
3. Erogenous sensitivity: the foreskin contains a rich variety and large concentration of highly specialized nerve receptors (e.g., Meissner’s and Vater-Pacini corpuscles) and free nerve endings equivalent in sensitivity to those of the fingertips, lips and mucosal lining of the mouth.
4. During erection the double-layered foreskin provides the skin necessary to accommodate a normal erection and to allow movement of this skin over the shaft and glans.
5. During masturbation, the foreskin enables a wide range of stimulatory motion not possible in circumcised males.
6. During sexual intercourse the mucosa of the foreskin facilitates smooth and gentle movement between the penis and the mucous membrane of the vagina.

According to Taylor,<sup>15</sup> the foreskin is frequently mislabeled as ‘skin’ or ‘loose skin’. Limited descriptors such as these tend to de-emphasize the functional role of the foreskin. A comparison of medical dictionary definitions of both the eyelid and the prepuce illustrates this point. The eyelid is described as, “... a movable fold of thin skin over the eye, with eyelashes and ciliary and meibomian glands along its margin. It consists of loose connective tissue containing a thin plate of fibrous tissue lined with mucous membrane. The orbicularis oculi muscle and the oculomotor nerve control the opening and closing of the eyelid.”<sup>16</sup> The prepuce, in contrast, is referred to as, “... a fold of skin that forms a retractable cover, such as the foreskin of the penis...”<sup>17</sup> There are doubtless many differences between the eyelid and the foreskin, but the similarities such as protection, movement and the presence of mucosal tissue are rarely mentioned although these were noted by Bigelow<sup>18</sup> and Fleiss.<sup>19</sup> It is clear that the foreskin has elaborate structure and function beyond that which is often acknowledged.

### **1.1.1 Functions of the foreskin during intercourse**

During intercourse, the skin of a genitally intact penis slides up and down the penile shaft, stimulating the glans and the nerves of the inner and outer foreskin.<sup>20,21,22</sup> On the outstroke, the glans is partially or completely engulfed by the foreskin with more skin remaining inside the vagina than is the case with a circumcised penis.<sup>23</sup> This 'valve' mechanism is thought to help retain the natural lubrication provided by the female because the bunched up skin of the foreskin acts to block the lubrication escaping from the vagina, which results in dryness.<sup>24</sup> In a survey of women's sexual enjoyment, O'Hara and O'Hara reported significantly more vaginal discomfort and dryness during intercourse with circumcised as opposed to intact partners ( $p < .001$ ).<sup>25</sup>

Clearly, circumcised men cannot experience that which is peculiar to having a foreskin. However, what difference the foreskin makes to sexual intercourse is unknown, except to men who have been circumcised as adults. Indeed, Money and Davison found that four of the five men circumcised as adults in their study rated penile sensitivity as diminished.<sup>26</sup> The quality and strength of erogenous sensations provided by the foreskin as compared with those elicited by the glans and shaft skin alone, is an issue that remains largely neglected.

### **1.1.2 Physical effects of circumcision**

One of the most identifiable physical effects of circumcision is the scar left by the surgical operation. Depending on the method used, scars can be raised, uneven or puckered. While these blemishes are often seen as harmless reminders of a childhood surgical procedure, Cold and Taylor suggested otherwise.<sup>27</sup> They described the presence of amputation neuromas, found commonly at the site of circumcision scars as tangles of nerve axons, cells and fibrous tissue. According to Taylor et al., these structures do not facilitate normal sensations and are well known for generating pain.<sup>28</sup> Prominent scarring and pain upon erection were physical consequences noted by 33% and 17% of respondents respectively, in a recent poll of circumcised men.<sup>29,30</sup>

Another physical consequence reported by circumcised males is bowing of the penis.<sup>31,32</sup> While two diseases cause the penis to bend dramatically (Peyronie's disease and Chordee), the type of bending often present in circumcised men is a combined result of too much skin removed, an uneven

cut<sup>33</sup> and sometimes, contraction of the scar tissue.<sup>34</sup> Reduced penile skin may also have a ‘burying’ effect causing the erect circumcised penis to protrude less from the body than an intact penis. In a study investigating the adequacy of condom sizes, Richters, Gerofi, and Donovan noted that circumcised men had significantly shorter erect penises by a mean length of 8mm than intact men ( $p < .05$ ).<sup>35</sup> The difference in erect penile size was attributed to insufficient skin to accommodate the erection.

The amount of tissue lost through circumcision varies depending on the method, the operator and the penis being circumcised. Van Howe asserted that the surgeon cannot adequately judge the appropriate amount of skin to remove because the penis will change considerably as the child ages.<sup>36</sup> As a consequence, some men have a ‘loose’ circumcision (part of the foreskin still covers the glans of the flaccid penis) while others have a ‘tight’ circumcision. Besides effectively tethering the penis,<sup>37</sup> Bigelow suggested that a tight circumcision causes the erect penis to use all the available skin often stretching it to the point where it is taut and almost translucent.<sup>38</sup> Insufficient skin to accommodate an erection can be uncomfortable or even painful because there is no free movement of the shaft skin. Further, some circumcised men have hair-bearing scrotal skin pulled two thirds or more of the way up the shaft of their erect penis.<sup>39,40</sup>

Circumcision also affects the technique used to masturbate. Money and Davison reported a “change in masturbatory technique” for men who had undergone circumcision as adults as there was now less or no skin to manipulate over the glans.<sup>41</sup> They observed that a genitally intact male could pull the foreskin repeatedly over the glans to self-stimulate, whereas a circumcised male, deprived of this source of stimulation, must rely on artificial lubrication to provide friction directly to the shaft of the penis during masturbation. Thus, circumcised men are compelled to adopt an unnatural compensatory technique.

### **1.1.3 Circumcision and sexual sensation**

That amputation of the foreskin reduces sexual sensation provokes strong comments on both sides of the debate. Those that promote routine neonatal circumcision on the basis of claims to prevent disease, have also stated that sex is no different or even better after circumcision. However, many circumcised men are adamant that the range and strength of erogenous feeling is reduced by circumcision.<sup>42,43,44,45</sup>

Little data exists on pre- and post-circumcision sensation except for a study on men circumcised as adults, which did find diminished penile sensitivity in all subjects after circumcision.<sup>46</sup> However, there have also been anecdotal reports. For example, Goldman cited letters from men who described orgasm after circumcision thus, "...like sight without color," or from a man circumcised at age 30, "there are feelings you'll just never have without a foreskin."<sup>47</sup>

Keratinization (leathery callous formation) of the exposed glans is perhaps one of the few outcomes of circumcision to be accepted by both those for<sup>48</sup> and against<sup>49</sup> the practice. A glans that is covered in layers of keratinized skin becomes de-sensitized, in much the same way that callused skin on the foot is able to withstand rougher ground and requires a greater degree of applied pressure before a response occurs. Van Howe discussed the possibility that circumcised men are more reluctant than intact men to use condoms because a layer of latex rubber would further decrease sensation from a desensitized and keratinized glans. Indeed, Europe where circumcision is rarely practiced, has a much higher usage rate of condoms than America where circumcision has been routinely performed for decades.<sup>50</sup> It follows that a progressive keratinization/desensitization effect on the surface of the glans is compounded as a man ages.<sup>51,52</sup>

One of the sexual consequences of a desensitized glans and loss of the foreskin's mobility and specialized erogenous tissue may be a need for intense stimulation to achieve orgasm (e.g., extraordinary thrusting during intercourse).<sup>53</sup> Hammond found that 40% of circumcised poll respondents supported this view and further, many claimed vaginal sex offered inadequate stimulation for pleasure or orgasm. Respondents also reported engaging in compulsive sexual behaviors or those providing potentially more intense stimulation (masturbation, oral/anal sex) possibly to compensate for a diminished sexual response.<sup>54</sup> Laumann, Masi, and Zuckerman found a higher incidence of self-stimulation, fellatio and anal sex among circumcised males<sup>55</sup> lending support for Hammond's findings.

Immerman and Mackey have postulated a theory to explain altered or reduced sexual sensation in the circumcised male.<sup>56,57</sup> When the sensory pathways from the penis to the brain are severed as a result of foreskin amputation, atrophy of neurons in the brain could occur due to a loss of erogenous sensory input. Indeed, cortical changes (atrophy of neurons; reassignment of neurons to other functions) after sensory deprivation to the eye are established findings in ocular research, reducing visual perception.<sup>58</sup>

Studies directly addressing the interplay of the human foreskin, circumcision and the central nervous system have yet to be conducted, however inferential evidence is available using other mammals. Kaas reviewed the literature on the plasticity of sensory maps and noted:<sup>59</sup>

1. Reorganization of sensory maps in the brain follows changes in neural activity patterns induced by inactivation of pathways produced by lesions *or by the removal of sensory surfaces, peripheral nerves* or more central structures [italics added].
2. The younger the individual is, the greater is the plasticity in the development of the nervous system.

Immerman and Mackey's hypothesis was that circumcision reorganizes the male's sensory somato-cortex (area in the brain where "touch" is received) to raise the threshold of sexual excitability/distraction.<sup>60</sup> They speculated that early male circumcision might enhance sexual compatibility in marriage because extramarital sexual activity might be reduced. This theory was not supported by Hughes who found heightened sexual compatibility was associated with the genitally intact male in a survey of 1500 couples married to the same spouse for over 50 years.<sup>61</sup>

O'Hara and O'Hara also found females preferred the genitally intact male for coitus and other sexual practices,<sup>62</sup> implying that partnerships where the male partner is not circumcised are more satisfying and hence more compatible. The empirical findings of Hughes<sup>63</sup> and O'Hara and O'Hara<sup>64</sup> do not support Immerman and Mackey's biocultural speculation on the effects of circumcision. However the established theory of cerebral reorganization after sensory deprivation<sup>65</sup> may help to explain the altered sexual behaviors in the circumcised male.<sup>66</sup>

An additional explanation for circumcised men engaging in a more-elaborated set of sexual practices may be that their overall satisfaction with sexual activity is lower. Although not measured directly, O'Hara and O'Hara reported that some respondents found that genitally intact men seemed to enjoy intercourse noticeably more in comparison with their circumcised peers.<sup>67</sup> If satisfaction is less for circumcised men, then seeking a wider variety of means to achieve pleasure may be a compensatory mechanism, suggesting a relative dissatisfaction with vaginal intercourse.<sup>68</sup>

#### **1.1.4 Sexual dysfunction**

There are conflicting findings on whether the absence of a foreskin contributes to sexual dysfunction. For example, Laumann et al. speculated that circumcision may have a beneficial impact on sexual functioning<sup>69</sup> because among their study's oldest age group of respondents (45-59 years), circumcised men reported slightly less experience of various sexual difficulties. This finding conflicts with a study surveying the experiences of women who had sexual experience with both circumcised and genitally intact men.<sup>70</sup> Women in this study reported circumcised partners as more likely to have premature ejaculation, across all age groups. As well, Money and Davison found that all five men in their study of men circumcised as adults reported a prolongation of the period prior to ejaculation.<sup>71</sup> Similarly, Stinson reported on five men circumcised as adults who complained of impotency after the circumcision operation.<sup>72</sup>

In the circumcised male, premature ejaculation and/or the inability to ejaculate are hypothesized to be a consequence of losing the fine-touch receptors in the foreskin after circumcision.<sup>73</sup> Without the sensory information provided by these receptors, the circumcised man may be less able to gauge when ejaculation is imminent and therefore unable to exert voluntary control over the ejaculatory reflex. In addition, it has been proposed that many circumcised males may have difficulty ejaculating because the trigger role that the fine-touch receptors play is absent.<sup>74</sup> Masters and Johnson however, speculated that the "retained foreskin probably contributes little if anything to the individual male's ejaculatory control,"<sup>75</sup> although how the authors could assert this without actually studying the foreskin during sexual activity is unclear. Statements that there are no adverse sexual effects of circumcision evidently rely on the relative lack of investigation into the topic.

#### **1.1.5 Psychological effects of circumcision**

Long-term psychological effects from circumcision can be difficult to establish because the nature of early trauma renders it difficult to recognize. However, lack of awareness does not necessarily equate to low impact on a person's emotions and behaviors. Early pre-verbal trauma could psychologically affect an individual substantially even if the incident is not consciously remembered.<sup>76</sup>

An early exploratory study by Cansever revealed psychological harm as a result of circumcision.<sup>77</sup> The study comprised a series of tests conducted pre- and post-operatively on 12 Turkish children undergoing ritual circumcision at the ages of five to seven years. Included in the findings was a disturbance in sexual identification, withdrawal and a tendency to show an increase in aggressive responses after circumcision.

In contrast to these findings of psychological harm after ritual circumcision, Schlossberger, Turner, and Irwin reported that circumcised adolescent boys ( $N = 73$ ) scored more highly on satisfaction items than did genitally intact boys.<sup>78</sup> However, membership of a subgroup (genitally intact boys perceived themselves to be in the minority) combined with early adolescent needs for conformity and social approval may have influenced their responses. Consequently, further research into the effect of increasing age on satisfaction is required.

Adult men have reported experiencing emotional and psychological harm as a result of being circumcised, both from the sense that their bodily integrity was violated as infants and from the belief that circumcision has adversely affected their sexual enjoyment as adults. In Hammond's polls many respondents attributed emotional distress to their circumcised state, including feelings of mutilation (60%) and psychological and physical suffering that impeded emotional intimacy with partner(s) often resulting in sexual dysfunction (41%).<sup>79,80</sup>

The findings from both these polls and anecdotal reports concur that men dissatisfied with their circumcision often have feelings such as: anger, resentment towards parents, a sense of having been cheated, hurt, sadness, inferiority and embarrassment.<sup>81,82</sup>

Since it is now widely accepted that infants are capable of experiencing pain and have the capacity for long-term memory<sup>83</sup> neonatal circumcision may qualify as trauma of the type that gives rise to the long-term symptoms described above. Indeed, since the 1970's, several researchers have suggested that neonatal circumcision causes trauma of the type that is associated with long-term physiological, psychological and behavioral consequences.<sup>84,85,86,87,88</sup>

Goldman speculated that the trauma associated with being circumcised originates in discovering one's circumcision as a child, especially if the child grows up in a community made up of children of differing circumcision status. One circumcised man quoted by Goldman described the time at age



five when during play with a genitally intact friend he discovered the difference between them. The man related that the experience "... had a profound effect, an imprinting on my mind" and, "...I was thinking about it so much everyday." The impact of such a discovery can have trauma-like consequences, such as recurrent, intrusive thoughts and images surrounding circumcision.<sup>89,90</sup> Indeed, many men circumcised as infants have expressed strong negative feelings about the violation of bodily integrity that involuntary foreskin amputation entails.<sup>91,92,93,94</sup>

The model of post-traumatic stress disorder (PTSD) in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*, may therefore apply to men circumcised as infants. According to Menage, adult males subjected to circumcision as infants exhibited discernible PTSD. Many circumcised men also reported feelings of abuse, shame, and of being mutilated. Likewise, Menage has also documented symptoms of PTSD in women after gynecological procedures and after circumcision in children of both sexes.<sup>95</sup>

Psychological consequences as a result of amputative or mutilative surgery are well recognized in the medical literature.<sup>96</sup> Potential effects of loss of body parts are:

1. Grief for altered body image or function, or both.
2. Anxiety, depression, and sexual problems.
3. Avoidance of or obsessive preoccupation with the loss.

Neonatal circumcision is amputation of a healthy, functioning, sexual body part and as such it is entirely feasible that this surgery could affect the psychological functioning of the adult male. There may be differences between age and circumstance in the discussion of circumcision and loss of other body parts. However, the psychological consequences may be similar to the PTSD symptoms of avoidance or emotional numbing.

## **1.2 Hypotheses**

The present study investigated differences in sexual sensation, satisfaction, behaviors and emotions between circumcised and genitally intact men that warrant further investigation. The study employed a survey method for exploring the sexual and emotional experiences of circumcised versus intact men. Three questionnaires were devised based on the preceding review of literature on circumcision damage. Using these surveys, the study

targeted three groups of respondents to investigate the long-term physical, sexual and psychological effects of neonatal circumcision:

- Men (survey group 1) completed the Sexual Awareness Survey (about self) on their physical, sexual and emotional experience of being circumcised, or genitally intact.
- Women (survey group 2) and Gay men (survey group 3) completed Sexual Awareness Surveys reporting on their partners' feelings about circumcision status and making comparisons of sexual practices between circumcised and genitally intact men.

It was predicted that in each of the three survey groups:

1. Respondents would report significantly more physical irregularities in circumcised as compared with genitally intact penises.
2. Respondents would report significantly reduced sexual sensation in circumcised as compared with genitally intact penises.
3. Respondents would report different techniques for stimulation of the circumcised as compared with the genitally intact penis during masturbation and intercourse.
4. Respondents would report significantly more sexual dysfunction in circumcised as compared with genitally intact men.
5. Respondents would report significantly more negative feelings associated with the circumcised as compared with the genitally intact state.

## **2. SURVEY METHODOLOGY**

Survey respondents were targeted from two main groups. First, men reporting on their experience of being circumcised or intact (survey group 1); through mens' groups and the St Andrew's Hospital Mens' Health Center in Brisbane. Second, women (survey group 2) and men (survey group 3) with sexual experience of circumcised and genitally intact men; through community groups and the Gay Pride Festival in Brisbane, many of whom distributed further surveys to their own friends and acquaintances. Additional gay survey respondents were recruited from Gold Coast, Queensland, and Perth, Western Australia.

In total, 553 Sexual Awareness Surveys were distributed across the three target groups, and 160 of these were returned representing an overall response rate of 29%. Males (responding about self) returned 83 surveys

(30%), females (about partners) returned 35 surveys (34%) and gay males (about partners) returned 42 surveys (25%). The age range of male (about self) respondents was 20 to 71 years (mean = 36.2,  $SD = 11.8$ ); among female respondents it was 18 to 69 years (mean = 33,  $SD = 10.8$ ); and among gay male respondents, 19 to 71 years (mean = 36.3,  $SD = 12.5$ ).

Across all three survey groups; male, female and gay male ( $N = 160$ ), the majority of participants were Australian born (79%); of Anglo-Celtic background (81%); were Christian (41%); or indicated no formal religion (46%). Respondents were predominantly in professional vocations (59%) and had completed tertiary education (61%).

## **2.1 Instruments**

Three questionnaires were constructed entitled the Sexual Awareness Surveys. These were specific to the gender and sexual orientation of the target respondents; males (about self), female partners and gay partners. The surveys were designed to investigate whether differences exist between circumcised and intact men on a range of questions about sexual functioning and emotional response to circumcision status.

Questionnaires contained 32 items targeting: sexual practices and techniques, sensations, occurrence of sexual dysfunctions and feelings about being circumcised or genitally intact, as well as demographic information in a forced choice response format.

Female and gay participants were asked to make comparisons of their circumcised and genitally intact partners and to report their number of circumcised and intact sexual partners. These respondents were also asked to indicate the status of their current partner (if applicable) and to give their preference for circumcised or genitally intact partners.

Where appropriate, a series of chi-square analyses ( $\chi^2$ ) and Spearman's rank-difference correlations ( $r$ ) were performed on the data to uncover significant differences between circumcised and intact men across the survey items. As the variables were all nominal or ordinal, more elaborate statistical analyses were not appropriate. However, data provided by the males (survey group 1) was amenable to a subsequent logistic regression analysis to assess the association between circumcision status and those variables from the

univariate analyses that revealed significant differences between circumcised and genitally intact men.

## 2.2 Demographic information

Demographic data were collected on respondents' country of birth, age, ethnic group, education level, religion and occupation. These questions required single word or numeric answers and were designed to permit evaluation of the study's participant composition.

## 2.3 Procedure

Sexual Awareness Surveys appropriate to gender and sexual orientation were distributed in a plain envelope along with a cover letter and Post Office Box addressed, reply paid envelope. Consent was implied from completion and return of the surveys.

## 3. RESULTS

Spearman's rank-difference correlation coefficients<sup>97</sup> were computed on the dichotomous survey variables to ascertain the strength and statistical significance of relationships between circumcision status and physical, sexual and psychological variables. The data were analyzed with chi-square ( $\chi^2$ ) tests.

### 3.1 Survey group 1 (Males about self)

Circumcised men were significantly more likely to report scars, pits or other damage to their penis ( $r = .26, p < .05$ ). When masturbating, circumcised men significantly more often used artificial lubrication ( $r = .35, p < .01$ ) and more often required painful stimulation ( $r = .25, p < .05$ ). Men reluctant to use condoms because of a concern about reduced sensitivity were significantly more likely to be circumcised ( $r = .22, p < .05$ ).

Post-orgasmic sexual satisfaction was significantly higher in genitally intact than circumcised men ( $r = -.25, p < .05$ ). Circumcised men were significantly more likely to avoid thinking about their circumcision status ( $r = .24, p < .05$ ).

As shown in Table 1 circumcised men reported a wider range of negative emotions associated with their circumcision status than did intact men. Specifically, circumcised men were significantly more likely to be angry  $\chi^2$  (df = 1, 12) = 4.8  $p < .05$ , hurt  $\chi^2$  (df = 1, 9) = 5.8  $p < .05$ , and to feel incomplete  $\chi^2$  (df = 1, 12) = 8.1  $p < .01$ , and cheated  $\chi^2$  (df = 1, 11) = 7.3  $p < .01$ .

Table 1. Negative emotions associated with circumcision status reported by male respondents

Survey Item	N <sup>a</sup>	Percentage of circumcised men who answered 'yes' <sup>b</sup>
Respondent felt angry	12	91.7*
Respondent felt hurt	9	100*
Respondent felt incomplete	12	100**
Respondent felt cheated	11	100**

<sup>a</sup> 83 respondents, 53 circumcised and 30 genitally intact men.

<sup>b</sup> \*  $p < .05$ ; \*\*  $p < .01$

### 3.1.1 Survey group 1 - Multivariate analysis

A logistic regression analysis was performed on circumcision status as outcome and six predictors identified with significant Spearman rank-difference correlations: *scars/other damage to shaft*; *use of artificial lubrication when masturbating*; *excessive/painful stimulation required when masturbating*; *reluctance to use condoms*; *post-orgasmic satisfaction*; and *reluctance to think about circumcision status*.

Analysis was performed using SPSS (Version 9.0) LOGISTIC REGRESSION. After deletion of 12 cases with missing variables, data from 72 men was available for analysis: 44 circumcised and 28 genitally intact men. Missing data appeared to be scattered randomly across categories of outcome and predictors.

A test of the full model with all six predictors against a constant-only model was statistically significant,  $\chi^2$  (df = 6,  $n = 72$ ) = 20.4,  $p < .01$ , indicating that the set of predictors reliably distinguished between circumcised and genitally intact men. Prediction success was impressive, 73% for circumcised men and 71% for genitally intact men with an overall prediction rate of 72%. *Use of artificial lubrication during masturbation* was the most reliable predictor of circumcision status among the six physical, sexual and psychological variables.

### 3.2 Survey group 2 (Females)

Females reported sexual experience with a mean number of 11.0 ( $SD = 12.00$ ) circumcised partners and 3.9 ( $SD = 3.9$ ) genitally intact partners. The mean number of partners where respondents were unsure of circumcision status was 1.6 ( $SD = 4.5$ ). Of 24 females with a current male partner, 15 had circumcised and 9 had genitally intact partners. In total, 22 females expressed a preference for the circumcision status of their next partner, 11 indicated they would choose a circumcised man, these women had a mean age of 27.3 years ( $SD = 8.2$ ). Eleven women indicating they would choose a genitally intact man had a mean age of 36.4 years ( $SD = 13.7$ ).

Women reported significantly more scarring  $\chi^2$  ( $df = 1, n = 20$ ) = 7.2,  $p < .01$  as well as significant curving or bowing of the penis  $\chi^2$  ( $df = 1, n = 17$ ) = 4.88,  $p < .05$ , more often in circumcised men. Circumcised partners were significantly more likely to experience a progressive decline in sensitivity of the head of the penis  $\chi^2$  ( $df = 1, n = 11$ ) = 7.4,  $p < .01$ . In addition, circumcised men were significantly less likely to use condoms, because of a concern about reduced sensitivity  $\chi^2$  ( $df = 1, n = 16$ ) = 4.0,  $p < .05$ . Females were significantly more likely to report vaginal dryness during intercourse with circumcised than genitally intact men  $\chi^2$  ( $df = 1, n = 20$ ) = 5.0,  $p < .05$ .

### 3.3 Survey group 3 (Gay males)

In the 12 months prior to completing the questionnaire, gay males reported sexual experience with a mean number of 7.7 ( $SD = 13.00$ ) circumcised and 4.1 ( $SD = 8.5$ ) genitally intact partners. The mean number of partners where respondents were unsure of circumcision status was 0.1 ( $SD = 0.6$ ). Of 35 gay males with a current partner, 17 had circumcised and 18 had genitally intact partners. A total of 36 respondents with a mean age of 35.6 years ( $SD = 11.2$ ) expressed a preference for the circumcision status of their next partner with 21 indicating they would choose a circumcised man. Fifteen men who expressed a preference for a genitally intact partner had a mean age of 36.9 years ( $SD = 15.2$ ).

Survey respondents reported scars, pits and other damage as significantly more prevalent in circumcised than genitally intact partners  $\chi^2$  ( $df = 1, n = 19$ ) = 11.8,  $p < .001$ . A progressive decline in sensitivity of the glans penis was reported as occurring significantly more among circumcised partners  $\chi^2$

(df = 1, n = 12) = 8.3,  $p < .01$ , and during oral or masturbatory sex, circumcised partners were significantly less likely to ask respondents to be gentler on their penis  $\chi^2$  (df = 1, n = 31) = 3.9,  $p < .05$ . In addition, a significant number of men reported having to use a different technique when masturbating their genitally intact and circumcised partners  $\chi^2$  (df = 1, n = 42) = 13.7,  $p < .001$ . Likewise circumcised partners were significantly more likely to use artificial lubrication when masturbating  $\chi^2$  (df = 1, n = 31) = 16.9,  $p < .001$ . Men engaging in anal sex reported that their active (insertive) partners were significantly more likely to be circumcised than genitally intact  $\chi^2$  (df = 1, n = 36) = 7.1,  $p < .01$ .

### 3.4 Survey groups 2 and 3 (Combined partner group)

Scars and damage to the penis were reported significantly more often on circumcised partners  $\chi^2$  (df = 1, n = 39) = 18.7,  $p < .001$ . The combined partner group reported that circumcised men required a different technique for masturbating  $\chi^2$  (df = 1, n = 75) = 12.8,  $p < .001$  and were significantly more likely to need artificial lubrication  $\chi^2$  (df = 1, n = 65) = 18.9,  $p < .001$ .

A progressive decline in sensitivity of the circumcised penis was reported  $\chi^2$  (df = 1, n = 23) = 15.7,  $p < .001$  and both females and gay males who had engaged in receptive anal sex reported that their insertive partners were more often circumcised men  $\chi^2$  (df = 1, n = 50) = 5.1,  $p < .05$ .

When considered together, females and gay men reported that circumcised partners were more often unhappy with their circumcision status than were genitally intact partners (Wilcoxon signed ranks test,  $Z = -2.2$ ,  $p < 0.05$ ).

A summary of results across study groups is presented in Table 2.

Table 2. Summary of items reported as significantly different for circumcised men

Survey Item	Self males	Female partners	Gay partners	All partners
Penis bowing when erect		*		
Scars and pits present	*	**	***	***
Progressive decline in glans sensitivity		**	**	***
Reluctance to use a condom because of sensitivity concerns	*	**		
Painful stimulation necessary to masturbate to orgasm	*			
Never found oral or masturbatory stimulation			*	

Survey Item	Self males	Female partners	Gay partners	All partners
too rough				
Different techniques when masturbating			***	***
Used lubrication when masturbating	**		***	***
'Active' partners in anal intercourse were more often circumcised			**	*
Avoided thinking about circumcision status	*			
Dissatisfaction with orgasms	*			
Female partners experienced vaginal dryness during intercourse		*		

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

#### 4. DISCUSSION

Men circumcised as infants clearly differ on several of the survey items analyzed in this study. The logistic regression analysis showed that participants (survey group 1) could be fairly reliably categorized as circumcised if they had penile scarring; used artificial lubrication and needed painful stimulation when masturbating; were reluctant to use condoms; had dissatisfaction with their orgasms and were reluctant to think about their circumcision status.

Incidence of circumcision reported by men, and as indicated by the partner history of women and gay men in this study was between 60% and 75%, comparable to the likely prevalence of circumcision among Australian men. It is not anticipated that response or recall bias were operating among the women and gay men here with respect to circumcision status of their previous partners or where a preference was indicated for the status of their next partner.

Of the physical irregularities investigated, penile scarring was a significant effect reported across all survey groups. Measurement of other items such as penile bowing, tight shaft skin, and pubic hair pulled up the shaft at erection, may have been improved with more discriminating phrasing of survey items.

Respondents indicated that their circumcised partners were more likely to experience reduced sexual sensation, used different techniques when masturbating and were more likely to engage in anal sex. Although self-evaluation of penile anatomy and sensitivity by men in survey group 1 revealed no self-acknowledged detrimental effects of circumcision, clear



sensory and mechanical differences were indicated by females and gay men between the circumcised and genitally intact penis.

There was no evidence found here to suggest recurrent erectile dysfunction or premature ejaculation in circumcised men and little suggestion that these men exhibited PTSD in relation to their circumcision. However, women and gay men indicated a higher level of discontentment among their circumcised partners. Although circumcised men did not identify themselves as unhappy they did report dissatisfaction with their orgasms and a wider range of negative emotions associated with their circumcision status.

## **5. CONCLUSION**

Most circumcised men do not show any manifest physical or psychological abnormalities that would immediately single them out from their genitally intact counterparts other than the absence of foreskin. In addition, accurate measurement of the effects of infant circumcision on adult health requires a thorough understanding of the functions of the genitally intact penis. Examination of effects is hindered by circumcised men's ignorance of natural penile physiology, unfamiliarity with identifying circumcision damage and defensive denial of harm.<sup>98</sup> Hence it is difficult for this population to evaluate and accept the possibility of the existence of injury. Despite public reluctance to accept the presence of harm in circumcised men there is a mounting body of evidence to which this study contributes.

Given the low response rate from the convenience sampling of the survey groups, it is considered that these data should be regarded as based on a volunteer study population. While a truly representative sample of men and women would be ideal this proved to be beyond the scope of this project. Perhaps future researchers can complement these findings with studies of different populations using similar survey instruments.

Further elucidation of the sexual effects of circumcision may be achieved by studies of the sexual nervous system especially the integrity of the brain-genital pathways before and after circumcision. PET (positron emission tomography) and MRI (magnetic resonance imaging) scanning may prove especially valuable in mapping brain activity during penile stimulation and

orgasm in genitally intact and circumcised males. In addition, men who have restored surrogate foreskins either surgically or non-surgically, may also provide insight into the effect of circumcision on sexual response and emotional health. Many of these men have reported an increase in sexual sensation previously denied to them through circumcision, confirming the findings of the present study that circumcision amounts to sexual reduction surgery.

Because these findings are of interest, the negative effects of circumcision on the sexual function and psychological well-being of the adult male needs to be part of any discussions providing informed consent in relation to infant circumcision.

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