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REVIEW ARTICLE

Hymenal morphology in children and adolescents following penile-vaginal penetration

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ABSTRACT

The hymenal injuries in adolescents due to penile penetration is more common and more severe than in adults because of the lack of sexual and child birth experience. In a case of rape which has occurred within few days, the medical professional can identify the injuries on genitalia which are supportive of vaginal penetration. But if the child presents at a later stage there may not be any injury or scar to prove sexual abuse.

The paper reviews the contribution of the different examination techniques in identifying the hymenal injuries, different features of an intact hymen, injuries and healing process, which can be expected if the hymen has been penetrated on adolescent children.

The appearance of the normal hymen, hymenal injuries healing process of adolescents are not well documented except deep lacerations and transection through the posterior hymen which leaves evidence of previous injury. Most of the publications conclude with stressing the importance of recording the detailed statement given by the child as medico legal diagnosis of alleged non-acute cases of sexual abuse. Therefore obtaining a detailed history of the incident which is the standard duty of care in managing a victim of sexual abuse is as important as recording and interpretation of the hymenal injuries to help the law to make a judicial judgment. The words like no evidence of penetration, normal hymen and intact hymen should be used with caution.

Keywords: hymenal injuries, adolecents, penile penetration.

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INTRODUCTION

Penetrative Child sexual abuse (PCSA) exists in every level of society leading to numerous long term effects on physical, psychological and social well-being of the child as well as their families. The evaluation of a PCSA victim is traditionally focused on the status of the hymenal membrane[1]. Retrospective studies in Sri Lanka have shown prevalence of sexual abuse among adolescents to be 21.95[2]. In adolescents, the hymenal injuries due to penile penetration is more common and more severe than in adults because of the lack of sexual and child birth experience [3].

Sri Lanka has a National Policy of reporting requirement of child sexual abuse and children are referred to a Judicial Medical Officer (JMO) for medico legal examination. The standard of care in medical evaluation of PCSA victim examination includes obtaining a detailed history of the incident, examination of the body and genitalia and the laboratory investigations. The JMO has a duty to provide medical evidence that can conclusively prove the act of penetration by thoroughly documenting the details of physical injuries.

Therefore the interpretation of findings in the female genitalia is a key component of the medico legal examination for suspected PCSA and the clinical examination by a JMO that supports the statement given by the victim is crucial in proving the crime committed by the defendant.

In a case of rape which has occurred within few days, the medical professional may be able to identify the injuries on genitalia which are supportive of vaginal penetration. But if the child presents at a later stage there may not be any injury or scar on genitalia to prove sexual abuse[4]. A study reported that only 2.2% of abused girls who presented late had diagnostic injuries whereas 21.4% of those were examined acutely had physical injuries[4]. The important fact is that the most child rape cases have a delayed disclosure[6] and according to the a study on predators of delayed disclosure(more than one week after rape) of rape in female adolescents and young adults the delayed age disclosers were in the age group of 12-17 years of age[5]. Therefore by the time the JMO examines the child, the injuries are most likely to heal to a certain extend thereby the interpretation of the non-acute findings of sexual abuse becomes debatable. Also, the interpretation of injuries on hymen is influenced by a variety of factors including the age, hormonal effects, individual variations, time interval between the assault and the evaluation and the examination techniques[6,7,8].

The studies have established that most ano-genital examinations of children and adolescent sexual abuse victims have no definitive evidence of abuse[1,4] or has non-disrupted intact hymen[8]. But the review of these literature revealed that the findings of the hymen of adolescents following rape have been interpreted differently.

The paper reviews different examination techniques used in identifying genital injuries, features of an intact hymen, injuries and healing process, which can be expected if the hymen has been penetrated on adolescent children.

METHOD

Articles published in English language from 1992 to 2018 concerning hymenal injuries in adolescents following penetration were accessed by a Google search on Medline Database. The search words used were "hymenal injuries", "adolescent" and "penile-vaginal penetration".

Different examination techniques

The genital examination of a child is done using several methods and approaches. The victims can be examined in prone knee-to-chest position, supine position with labial separation or labial traction and in lateral decubitus position[1,7,10,11]. The hymenal rim is traced with a cotton tipped applicator moisten with water when the child is in the supine position while a large cotton swab covered by a latex balloon can also be used[8]. The use of a colposcope is a standard at present as it has many advantages like good lighting, magnification and the fact that findings can be documented by obtaining a high quality photographs or video recording with a camera attached to it. [9,11].

McCann in his studies done in 1992 and 2007 has documented that the examination of the hymen using different approaches are important in visualizing the hymenal injuries[7,10]. He further describes that the hymenal injuries which were not visible by the supine labial traction technique were visualized during examination in the prone, knee-chest position while several anterior and lateral hymenal lacerations were only detected during the prone, knee to chest position. Gardner explains that the hymen looks thick when a child is examined at supine position and has been shown to thin out in knee-chest position[10]. While McCann recommends the supine traction and the prone knee chest position to identify changes due to sexual assault, Harmenn et. al. recommends a combination of all three standard techniques: supine position with labial separation or labial traction or knee-chest position which will increase the yield of positive findings to be designated as definitive evidence of sexual abuse[11].

Intact hymen

The hymen is described as a membrane which is thick (oestrogenized) or fine and transparent[10]. The hymenal configurations are described as annular (circumferential), fimbriated (frilly or folded type), cresentic, septate, cribriform, and imperforate and the shape of the intact hymen may change with the age of the child[3].

The clefts or notches, bumps or tags are described as frequent anatomical variations on the circumference of the hymen and are present particularly at 3 and 9 o`clock positions or upper part of the hymen [3,10,12] . The cleft or a notch is defined by authors as an indentation, division or a split at the rim of the hymen. The depth of the cleft

ranged from 0.5 mm to 3 mm from the free end of the hymen and was found in 35% of neonates and.[12] The other anatomical variations described by Harmenn are bumps, mounds and polyp like hymenal tags.[11]

The study on morphology among adolescent girls with and without a history of consensual sexual intercourse revealed that the adolescent girls who have no deep notches in the hymen could still have experienced penile-vaginal penetration, because 52% of the subjects in the study did not have deep notches or complete clefts in the lateral or posterior locations in the hymen. The study concludes that the absence of notches does not rule out previous penetration in an adolescent therefore the term intact should be avoided when describing a hymen that is free of clefts[8]. McCann is of the same opinion stating that calling a hymen 'normal, without evidence of previous injury' need to be exercised with caution[1]. But the posterior rim of the hymen measuring at least 1 mm is always present unless there has been trauma[13]. However, Adams is of the opinion that if the posterior rim of the hymenal tissue is clear and the free end of the hymen can be followed visually from 3 o`clock to 9 o`clock position when the patient is in supine position it is a normal hymen[9].

Hymenal injuries

Different types of injuries to the hymen due to penile-vaginal penetration are described in the literature and the McCann in his publications has described hymenal injuries in detail as abrasions, contusions, lacerations and transections. A contusion is evident as blood blisters, oedema, haematoma, petechiae, and submucosal haemorrheges[1,7]. A blood blister is a small blood filled vesicular lesions and a laceration is described as a breach of hymenal tissue due to an injury. The lacerations were categorized according to the depth. If a laceration penetrated <50% of the width of the hymen it was considered superficial, if it penetrated halfway it was intermediate, if penetration was >50% it was deep.[1]

Medical evidence of penetration of the hymen

While Adams et. al. states that the deep notches and complete clefts at 3 and 9 o`clock positions and on the posterior portion of the hymen is a significant finding in girls with previous penetration[8]. Anderst et. al. states that the definitive findings of hymenal penetration includes a healed hymenal transection in an area between 4 and 8 o`clock positions, a missing segment of hymenal tissue in the posterior half of the hymen or presence of acute injuries[14]. The authors defines a transection as an area on the rim of the hymen that appeared to have been torn through to or nearly to the base of the hymen. The study of differences in hymenal Morphology between adolescent girls with and without a history of consensual sexual intercourse found that deep notches and complete clefts in the hymen at the 3 o`clock or 9 o`clock position as well as in the lateral and posterior rim of the hymen is strongly suggestive of previous penetration[8]. But the reviewed literature concludes that the healed hymenal transaction on the posterior rim of the hymen is a definitive finding of penetration[1,7,15]. While the presence of positive findings supports allegations of prior penetration, their absence does not preclude trauma from having occurred[17].

The width of the hymenal orifice which was once considered as evidence of penetration, now has no informative value as it varies markedly with the child's examination position, the degree of relaxation, the type of the hymen and the tissue oestrogenization[3,10,11]. Harmenn et. al. states that the use of tampons may also cause widening of the hymenal opening without causing injuries on the hymen[11]. Although there are no publications of normal variations of the width of the hymenal rim, the attenuation/narrowing of the hymenal rim is categorized as consistent with penetrative sexual abuse[13,18].

Adams et. al. who measured the posterior rim of the hymen between the edge of the hymen and the base of the hymen where it meets the vestibular fossa inferiorly identified that the width was 2.5 mm in adolescents with history of consensual intercourse and 3 mm among the group who denied past sexual intercourse. McCann is of the opinion that a width of less than 1 mm of the posterior rim of the hymen is a significant finding of hymnal penetration[1].

Healing process

According to McCann and also other studies the hymeneal injuries in adolescent girls heal rapidly and leave only the slightest evidence of a previous injury [1,4,7,13]. He further describes that minor injuries like abrasions and mild sub mucosal haemorrheges disappear within 3 - 4 days but marked haemorrheges persist for 11-15 days. The petechae which are described as pin head sized lesions resolved in 72 hours. The blood blisters had disappeared in 34 days in adolescents. Abrasions on adolescents have disappeared by day 4 leaving only a localized area of erythema. Most signs of acute

injury disappears within 7-10 days. The author has observed that the oedema and the submucosal haemorrhege affect the depth of the hymen in both ways. When the oedema and sub mucosal haemorrheges subsided the lacerations appear shallower in several cases in his study and the lacerations which was determined as deep at the initial examination was reclassified as transections in follow up examinations[1].

The jagged margins due to the laceration on the hymen smoothed out with the healing process and is difficult to identify[1]. This opinion was supported by Harmenn saying that the V shaped notch or cleft due to trauma may take the shape of a U which is called `concavity`[11]. The edges of the lacerations were rounded off and the narrow hymenal rim at the point of the injury was the persistent findings[1].

Anderst J et. al. whose study was to evaluate the association of definitive hymenal findings with number of episodes of penile-genital penetration detected 80% of victims who provided a history of more than 10 events of penetration had no definitive evidence of penetration on examination of the hymen[15]. Other literature supports a similar view stating that no scar tissues were identified in any of the patients[1] and superficial or intermediate tears healed completely without leaving a scar[11]. The notches of over 50% or transections remain as permanent scars even after several years[3,6,19]. Severe hymenal scars, such as deep notches of over 50% or transections, may remain permanently even after several years[6,19].

It maybe concluded that a detailed history is important in medico legal diagnosis of alleged non-acute sexual abuse in children. Therefore a detailed statement must be recorded from the child.

SUMMARY

The hymenal injuries on children and adolescents heal rapidly and may not leave conclusive evidence of abuse. Definitive evidence of penetration is deep lacerations and full thickness transection through the posterior hymen. Views on the concept of intact hymen, types of injuries and the healing process of hymenal injuries on adolescents following penile-vaginal penetration vary. As the appearance of the hymen is influenced by factors including the examination technique it is advisable to use a multimethod approach to examine hymenal injuries. Opinions like “no evidence of penetration”, “normal hymen” and “intact hymen” should be used with caution. Obtaining and recording a detailed history of the incident is an important component of the medico legal examination of adolescents following penile-vaginal penetration.

LIMITATIONS OF THE STUDY

None

ETHICAL ISSUES

Not obtained

CONFLICTS OF INTEREST

None

AUTHOR CONTRIBUTIONS

JW: Literature review, writing the manuscript, did corrections, type setting

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