Perineal Trauma at Childbirth

Khaled M.K. Ismail
Editor

Springer

Perineal Trauma at Childbirth

Khaled M.K. Ismail
Editor

Perineal Trauma at Childbirth

Springer

Editor
Khaled M.K. Ismail
University of Birmingham
Birmingham, United Kingdom

ISBN 978-3-319-14859-5 ISBN 978-3-319-14860-1 (eBook)
DOI 10.1007/978-3-319-14860-1

Library of Congress Control Number: 2017932803

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

In 2011, I was very privileged to meet a group of clinicians who share my clinical and academic interest. Without much debate or deliberation, the Perineal Trauma **P**revention, **E**ducation, **E**valuation, **R**epair and **S**canning (PEERS) group was conceived. This collaboration has enabled us to share good practice, publish collaboratively, run training workshops and along the way learn a lot from each other. To date, the PEERS group has conducted 5 full and 8 taster workshops in 11 countries spanning four continents. This textbook is the most recent challenge that the PEERS group, unanimously, agreed to take on board.

Perineal trauma at the time of childbirth affects hundreds of thousands of women in Europe and millions worldwide every year. A repair for such trauma is one of the commonest procedures undertaken in medicine. However, there are a few issues that are quite peculiar about this subject. It is an area of clinical practice that falls between two subspecialties (maternal medicine and uro-gynaecology), is assessed and repaired by two independent professions (obstetricians and midwives) and its complications managed by a large multidisciplinary team. Accordingly when planning the chapters for this book, we had these issues in mind and invited authors beyond the PEERS group to ensure that there is multidisciplinary input from leading clinicians in those fields. This book is also written and edited with both obstetricians and midwives in mind as target audience. Indeed all the authors of this book are committed to both multiprofessional training and service delivery.

There is high-level evidence demonstrating that proper assessment and repair of perineal trauma can significantly improve outcomes for women. However, nothing beats trauma prevention when it comes to long-term outcomes, particularly for higher grades of perineal trauma. The PEERS group is very keen on the dissemination of this aspect of care and indeed has dedicated several chapters in this book to highlight what practitioners can do to reduce risk of perineal trauma, obstetric anal sphincter injuries, wound complications and postnatal urinary incontinence. In addition to prevention, we present several aspects related to perineal trauma and its management including, a historic perspective, anatomy and physiology, clinical assessment, pelvic floor imaging, perineal mapping, methods and materials for repair and a framework for implementation of evidence into practice. The chapters

within this book feed into each other and are interlinked. Nevertheless, each chapter covers a succinct topic and could be read on its own.

I feel honoured to be given the opportunity to edit this book. Apart from the enjoyment I had whilst reading about a clinical topic that I am very passionate about, it gave me time to reflect on several aspects: first, how little we know about something that is so common; second, how much we know that is not translated to actual care that would make a real difference; thirdly, how many of the challenges and difficulties that we face are, in fact, similar despite our perceived differences and last but not least how much women have endured over the ages and continue to do so.

I hope you enjoy reading this book as much as I enjoyed editing it.

University of Birmingham
Birmingham, UK

Khaled Ismail

Acknowledgements

The PEERS group who has created this reference work comprises a multiprofessional interdisciplinary team of clinical academics from different countries (currently all in Europe) who have a shared interest in the field of prevention and management of childbirth-related perineal trauma. Our group believes that structured training is key to facilitate the implementation of evidence into practice. Each member of our team has a vast and varied experience in delivering practical training in our area of interest in different settings and healthcare services.

PEERS has been running non-profit workshops since 2011 aimed at spreading evidence-based practice and building multiprofessional capacity with the ultimate goal of improving childbirth-related perineal outcomes for women globally.

Current PEERS Group Core Members:

Khaled Ismail – UK (Chair).

Vladimir Kalis – Czech Republic.

Katariina Laine – Norway.

Jan Willem de Leeuw – Netherlands.

Renaud de Tayrac – France.

Sari Raisanen – Finland.

Contents

1 Perineal Trauma: A Historical and International Perspective 1
Christine Kettle and Khaled Ismail

2 Anatomy and Physiology of the Pelvic Floor 17
Renaud de Tayrac, Katharina Jundt, Vincent Letouzey, Mélanie Cayrac, Florent Masia, Eve Mousty, Pierre Marès, Michel Prudhomme, Xavier Fritel, and Brigitte Fatton

3 Perineal Mapping 41
Vladimir Kalis, Magdalena Jansova, and Zdenek Rusavy

4 Risk Factors for Perineal Trauma 71
Jan Willem de Leeuw, Sari Räisänen, and Katariina Laine

5 Intrapartum Interventions and Risk of Perineal Trauma 83
Katariina Laine, Sari Räisänen, and Vladimir Kalis

6 Assessment and Postnatal Management of Genital Tract Trauma 97
Teresa Arias and Debra Bick

7 The Role of Imaging in Assessing Perineal Trauma 115
Xavier Fritel, Anne-Cécile Pizzoferrato, Vincent Letouzey, Guillaume Legendre, Renaud de Tayrac, Katharina Jundt, and Arnaud Fauconnier

8 Perineal Trauma and Its Impact on Women's Health 147
Sara Webb, Katariina Laine, and Jan Willem de Leeuw

9 Perineal Trauma and Pelvic Floor Muscle Training 161
Amallia Brair, Nina Bridges, and Khaled Ismail

10 Management of Perineal Trauma Complications: The Role of the MDT 169
Kaori Futaba, Simon Radley, Sara Webb, and Matthew Parsons

11 Role of Training to Reduce Perineal Trauma at an Organsiational Level 181
Katariina Laine and Sari Räisänen

Index 187

Chapter 1
Perineal Trauma: A Historical and International Perspective

Christine Kettle and Khaled Ismail

Abstract Review of historical literature confirms that perineal injury has occurred during childbirth throughout the ages and that various methods and material were used by accoucheurs in an attempt to restore the integrity of severely traumatised tissue. Perineal stitching following childbirth was advocated in ancient writings on midwifery and obstetrics, however the procedure was not routinely practiced.

Women remained the prominent figure during confinements in the early centuries and male physicians or barber-surgeons were only called in as a last resort if problems occurred. During the eighteenth century the introduction of forceps together with episiotomy to facilitate difficult deliveries had a major impact on the extent of perineal trauma and its subsequent repair. Furthermore, women were encouraged to deliver in a more supine position rather than upright so the perineum was more accessible and the full extent of perineal trauma sustained could be assessed. During this period more attention was made to minimising perineal trauma and various methods including supporting the perineum and applying pressure to the vertex to prevent rapid expulsion were implemented. By the end of the nineteenth century practitioners were advised to suture all perineal trauma. However, it was not until the early twentieth century that local anaesthetic was advocated to ease the pain prior to performing and suturing episiotomies. In the UK, midwives did not receive any formal training until the late eighteenth century and it was not until the late twentieth century that midwives were permitted to undertake perineal suturing.

"May the lessons of the past be a guide to the future"

C. Kettle (✉)
Faculty of Health Sciences, Staffordshire University, Stoke-on-Trent, UK
e-mail: C.Kettle@staffs.ac.uk

K. Ismail
University of Birmingham, Birmingham, UK
e-mail: k.ismail@bham.ac.uk

K.M.K. Ismail (ed.), *Perineal Trauma at Childbirth*,
DOI 10.1007/978-3-319-14860-1_1

Keywords Childbirth • Historical • Perineal trauma • Man midwives • Ancient writings • Assessment • Classification • Non-suturing • Suturing • Perineal integrity and training

Introduction

Perineal trauma sustained during childbirth is not a new phenomenon as review of historical literature from 2050 BC to the 1900 AD confirms that women have suffered injury throughout the centuries. In fact, the earliest case of severe perineal injury sustained during childbirth was observed in the mummy of Henhenit. She was Nubian woman, approximately 22 years of age, and was thought to be a queen or a dancer in the court of King Mentuhotep of Egypt 2050 BC ([9, 18, 29], p. 15). Derry [9] observed that Henhenit's pelvis was an abnormal shape and that there was rupture of the vagina into the bladder, which may have been due to cephalopelvic disproportion occurring at the time of parturition and probably resulted in her early death.

This chapter will include review of ancient writings relating to perineal repair, factors contributing to the main causes of perineal trauma, assessment and classification, non-suturing, protecting the perineum, methods used to restore perineal integrity and training issues.

Ancient Writings Relating to Perineal Repair

As far back as early civilisation it has been tradition for labouring women to be attended by female '*midwives*', men were excluded from the birth chambers and the secrets of their profession were closely guarded. As a consequence very little information regarding normal childbirth was handed down in writing because *'women'* were usually uneducated and incapable of recording their experiences. The early writings on pregnancy and labour compiled by Hippocrates (born 460 BC) contributed very little to midwifery practice, probably due to the fact that physicians had very little scientific knowledge of the mechanisms of normal childbirth ([36], p. 2).

At the beginning of the second century Soranus, a Greek physician and distinguished writer on obstetrics and gynaecology, wrote on the subject of childbirth ([43], p. 15). One of his manuscripts, known as '*De Morbis Mulierium*', was the first textbook to be written for midwives and this became the principal midwifery treatise of ancient times and continued to be important throughout the next 1,500 years ([18], p. 72; [36], p. 2). Soranus's writings on obstetrics and gynaecology formed the foundation of many midwifery and obstetric textbooks that followed.

During the medieval period the standard text on obstetrics and gynaecology was based on a series of Latin works known as '*Trotula*' after its author ([12], p. 11; [43], p. 26). Trotula was thought to be a female physician or midwife who graduated

from the famous Medical School of Salerno in Italy during the eleventh century. However, Towler and Bramall [43] suggest that Trotula (*Madame Trotte de Salerne*) may have been male who assumed female identity, as '*it would have been offensive to women for men to interest themselves in such matters*'. Graham [18] also supported this theory.

It would appear that '*Trotula*' was based on the original work of Soranus and throughout the text the '*midwife*' is instructed to deal with obstetric complications whilst the '*doctor*' addressed only gynaecological problems ([43], p. 27). Only two chapters deal with obstetric conditions and very little is mentioned about normal labour and delivery. '*Trotula*', was translated from the original Latin version into English during the fourteenth and fifteenth centuries. The manuscript was part of the Sir Hans Sloane medical manuscript collection (thirteenth to seventeenth century), which is now held at the British Library (Index number Sloane MS 2463).

The first English midwifery textbook to be printed was entitled '*The Byrthe of Mankynde*'. This was translated from '*De Morbis Mulierium*' by Richard Jonas and was published by Thomas Raynalde in 1540 (cited in [12], p. 11; [37], p. 14). The title was changed to '*The Woman's Boke*' in later editions. It is interesting to note that stitching of perineal trauma was advocated in all of these ancient writings on midwifery and obstetrics ([18], p. 121, [43], p. 27).

In the '*The Byrthe of Mankynde*' if a woman had a *'complete'* perineal tear, the midwife was instructed to wash the '*parts*' with '*butter and wine*' and to… "*sowe to geder yat pece that is broken with a silken threde with a quarell* [square sided] *nedell in thre places or on foure and sithen do pitche on a softe lynnen cloth and leye it to ye prevy members*" (cited in [36], p. 5). Following this procedure a linen dressing was applied to the wound and kept in position for 7 days, during which time the midwife was instructed to "*let her eten and drynken but litell and keep her well from cold and from etes and drynkes that might maken her eny coughe*" (cited in [18]).

Despite the fact that '*midwives*' were advised to stitch '*complete*' perineal tears following childbirth, it would appear that this procedure was not routinely practiced. Eccles [12] suggested that the reasons for not suturing might be due to either "*resistance on part of the patient or squeamishness on the part of the midwife*". Hence, '*The Byrthe of Mankynde'* recommended an alternative method of perineal repair, whereby pieces of linen cloth were stuck to each side of the perineal wound and then stitched together… "*take two lyttell peces of lynnen cloth, eche of the length of the wounde, and in bredth two fyngers brode: spred the lyttell clothes with some faste cleauynge plaster the which wyll cause the clothes to stycke fast where they shalbe set, then fasten them the one on the one syde of the ryfte, the other on the other side, so that nothyng appeare betwene the peces of lynnen in the myddes of them, but onely the clefte and ryfte of the wounde in the breadthe of a strawe, then this done, sowe these sydes of lynnen together close as before I bed you to sowe the skynne: and when they be thus styched to gether, laye a lyttell lyquyd pytche vpon the seme: and this done the lappes and sydes of the wounde vender the lynnen plaster wyll grow to gether agayne and heale, and then may ye remove your plasters*" (cited in [12], p. 105–106).

Factors Contributing to the Cause of Perineal Trauma

Insight into the cause and extent of perineal trauma sustained during childbirth was provided by the writings of '*man-midwife*' Percivall Willughby (1596–1685). He developed an interest in midwifery following his apprenticeship to a barber-surgeon and practised in Derby, Stafford and London. Willughby utilised his theoretical knowledge and practical skills to educate midwives not to interfere with the normal process of childbirth. During the time that Willughby practiced, it was common for women to deliver in a more upright position on birthing stools, with the '*private parts*' covered so that the midwife or accoucheur could not view the external genitalia during delivery thus maintaining modesty ([37], p. 12). However, at the first sign of labour, the attending midwife would try to manually dilate the cervix and stretch the vagina, which caused swelling to the genitalia and perineal injury ([12], p. 106).

Delivering babies remained mainly 'women's work' during the seventeenth century and families relied on skillful 'midwives' to safely deliver babies, however male physicians or barber-surgeons were called in, as a last resort, to assist if the midwife failed to deliver the baby. Sometimes he would have to dismember and extract the fetus with crochet hooks and knives to save the life of the mother, however, more often than not, these instruments caused considerable perineal injury and fistulae between the rectum, vagina and bladder. Any attempt made to repair this type of trauma often failed and the surviving victims of these traumatic births were reduced to a life of misery with '*weakness*', '*prolapsed organs*', vulval '*itching*' and no control over the bladder or bowels ([17], p. 232; [37], p. 43).

During this period of time, the Chamberlen brothers played a leading role in midwifery and a new technical advance emerged to revolutionise the management of difficult births. They became very successful as 'man- midwives' and they were invited to serve royalty. In a treatise on midwifery, Hugh Chamberlen claimed that his family had designed an instrument (the obstetric forceps) that could bring about a safe delivery, which was kept secret for more than 100 years. In order to maintain secrecy, the forceps were carried into the birthing room in a lined box and would only be used once everyone was out of the room and the mother was blindfolded or the baby was delivered under drapes. Once the secret was divulged, forceps were modified and used more widely during the eighteenth century, however there use remained controversial.

During the eighteenth century the introduction of forceps together with episiotomy to facilitate difficult deliveries had a major impact on the extent of perineal trauma and its subsequent repair. The primary repair of the episiotomy would quite often be unsuccessful but this was thought to be better than having a tear, which may have extended through into the rectum leaving the woman incontinent of faeces [37].

Episiotomy

According to the literature, Sir Fielding Ould was the first to describe the procedure of making a cut (perineotomy) into the perineum and he recommended that it should be performed in cases where the external vaginal opening was so tight that labour

was dangerously prolonged [34]. At first this procedure was performed very rarely in emergencies as a last resort.

It was more than 100 years later when the procedure was reported in the United States of America by Taliaferro who described cutting a small mediolateral episiotomy to facilitate delivery in a young eclamptic woman [39].

Obstetricians only came to favour the procedure after publications by two American obstetricians [8, 35] which stated that perineotomy, was of 'extreme value in diminishing danger of death and injury to the first born' and should be performed routinely to shorten the second stage of labour; preserve the integrity of the pelvic floor and forestall uterine prolapse. DeLee redefined childbirth as pathogenic in nature and the perineum became a vulnerable site for surgical intervention [8].

By the 1930s, most American Hospitals had accepted episiotomy (perineotomy) as a routine procedure but it was not so widely used in Britain until the 1950s when childbirth became increasingly medicalised [42]. Episiotomy rates in the United Kingdom steadily increased until, by the 1970s it was as high as 91 % in some hospitals, [41]. This widely used obstetric procedure was introduced without substantial scientific evidence to support either its benefits or risks and its efficacy became the centre of controversy. Some argued that the procedure actually reduced the incidence of severe perineal trauma and prevented over stretching of the pelvic floor muscles which could lead to long-term problems such as stress incontinence and uterine prolapse [11, 16]. Others argued that episiotomy caused more pain, weakened the pelvic floor structures, interfered with breast-feeding and increased sexual problems [19, 27]. Major variations in current national rates may in itself indicate uncertain justification for this practice [1].

Classification and Assessment of Perineal Trauma

During the middle ages, women delivered in upright positions and their private parts were hidden under clothing as it was improper to cast one's eyes on the '*genitalia'*, therefore little would be known regarding the full extent of trauma sustained. During the eighteenth century women were encouraged to deliver in a more supine position so that the perineum was more accessible and subsequent damage could be seen [15].

In 1897, Jellett described laceration of the perineum as "*one of the commonest accidents occurring in midwifery*" and stated that "*it occurs far more frequently than is supposed; as, unless it be looked for with care, it may not be noticed*". He also defined perineal trauma into two classifications:

a. *Complete: the laceration extends right through the perineal body into the rectum*
b. *Incomplete: the laceration involves the perineal body alone*

(Jellett [25], p. 234)

In the early twentieth century, DeLee reiterated the importance of thoroughly examining the perineum after delivery and wrote in his book for obstetric nurses that ….. '*of more importance are the tears of the pelvic floor, which are hard to find and are usually overlooked by the general practitioner. When the perineum is torn*

deeply, the anus and rectum may be laid open. This is a sad accident, as the woman may thus lose control of the bowel. Immediate repair of the injury should be made' ([7], p. 33). He also described three degrees of perineal lacerations: '*first, through the fourchette; second, to, but not through the sphincter of the anus; and the third degree, through the anus into the rectum'* ([7], p. 118). This was similar to the definition of perineal tears that was used in the England up until the twenty-first century.

Non-suturing of Perineal Trauma

The controversy regarding the best management of perineal trauma, relating to suturing versus non-suturing, has continued throughout the centuries.

Prior to the seventeenth century, unless the perineum was severely torn the majority of trauma sustained during childbirth was left to heal naturally aided by ointments, some of which consisted of "*oil of worms and foxes with a little blind whelp, well boiled*" (cited in [12], p. 105). Herman [23] advised that tears would generally heal if the "*patient be kept clean with her legs tied together*" and that "*if the sides of the tear, is not perfect, the only result is that the vaginal orifice remains enlarged*". Even when severe perineal trauma was sutured, the failure rate was very high probably as a result of infection due to poor hygiene and lack of aseptic techniques. Puerperal fever was prolific due to "*interference in the birth canal*" by midwives and accoucheurs with "*unwashed hands and instruments*" and many women died as a result of this ([12], p. 129).

William Smellie, a London surgeon, and '*man-midwife*' (1697–1763) did not advise suturing the ruptured perineum except when the trauma was severe, because the stitches were inclined to cut through the tissue and were thought to be unnecessary [36]. Some practitioners including Willughby thought that it was not advisable to attempt to suture perineal trauma, even if it was severe and had extended into the rectum, as the '*rift*' would facilitate easier childbirth during subsequent deliveries. Whereas, French '*man-midwives*' of the mid-sixteenth century, such as La Vauguion and Pare, advocated stitching, even though the scar may complicate the next delivery, because they thought that "*the excrements coming that way*" from the women would disgust the husband and she would not be "*fit for his caresses*" (cited in [12]).

In 1904, DeLee wrote that …. ' *still it is also true that sometimes the perineum will tear like wet blotting-paper, and no skill can save it. In communities where the above notion is prevalent, the physician is often tempted to neglect the repair of lacerations of the perineum, as he will acquire a reputation of "tearing his women". His neighbour does not have lacerations because he does not put in so many "stitches". The nurse may do much to assist the conscientious physician by explaining to the family the frequency of injuries to the pelvic floor and the necessity for their repair'* ([7], page 118).

In the mid twentieth century, Magdi [29] reported that the incidence of perineal trauma at his hospital in Cairo was 24 % in primips as compared to 2 % in multips.

He associated this remarkably low rate of perineal injury among multiparous women to the fact that many of them had sustained damage during previous deliveries, which "*being attended by a midwife, was left unsutured*".

Magdi stated that it was a "*lamentable fact that midwives are in the habit of ignoring perineal trauma and neither practising nor calling for suturing to be performed*". Indeed, it would appear that the modern trend of midwives supporting a policy of non-suturing perineal trauma following childbirth is not a new concept.

Throughout the ages it is apparent that attempts were made to repair severe perineal trauma, using various methods and materials but as stated by Magdi [29] they were usually unsuccessful and "*the profession fell back to the helpless postural treatment*". Up until the late nineteenth century, women with severe perineal damage were confined to bed for up to 6 weeks and nursed on their side with their legs tied together to encourage healing by secondary intention [29].

Protecting the Perineum

Throughout the ages midwives have been instructed to support the perineum with a pad while the head is advancing to prevent severe perineal trauma. Soranus of Ephesus, in the second century, and Trotula, in the eleventh century, documented evidence of this practice [32, 40].

During the eighteen century, more attention was given to preventative methods to preserve the integrity of the perineum, which possibly developed as a result of the difficulties encountered in repairing severe perineal trauma. Harvie [22] wrote that '*were the delivery left to nature, the perineum would generally be torn at the time when the head of the child protrudes through the os externum, particularly at the birth of a first or second child*'. He also documented that …. '*the preservation the perineum being of the greatest consequence ought to be principally attended to by midwives; and this I think may be best done by observing the following rules, the importance of which experience had taught me'*. He then instructs the midwife to apply the palm of the hand against the perineum with '*proper force*' during the contraction in order to allow the fetal head to advance slowly and prevent tearing. He concluded by stating that… '*who ever attends to these rules, and puts them in practice with patience, will most certainly prevent the fatal consequences which hurrying a delivery to often produces*' [22].

In 1855 a German obstetrician named Ritgen, described a manoeuvre used during the second stage of labour to minimise perineal trauma. The accoucheur was instructed to reach for the fetal chin between the woman's anus and coccyx and to pull it anteriorly and at the same time the fingers of the other hand was placed on the fetal occiput to control the speed of the delivery and keep the head flexed (Fig. 1.1). The original manoeuvre was performed between contractions.

This was later modified and was performed during contractions in the second stage of labour and was first described in the 14th edition of Williams Obstetrics in 1971.

A similar technique was described by Solomon Bender (consultant obstetrician and gynaecologist – Chester) in his book titled 'Obstetrics for Pupil Midwives' ([3],

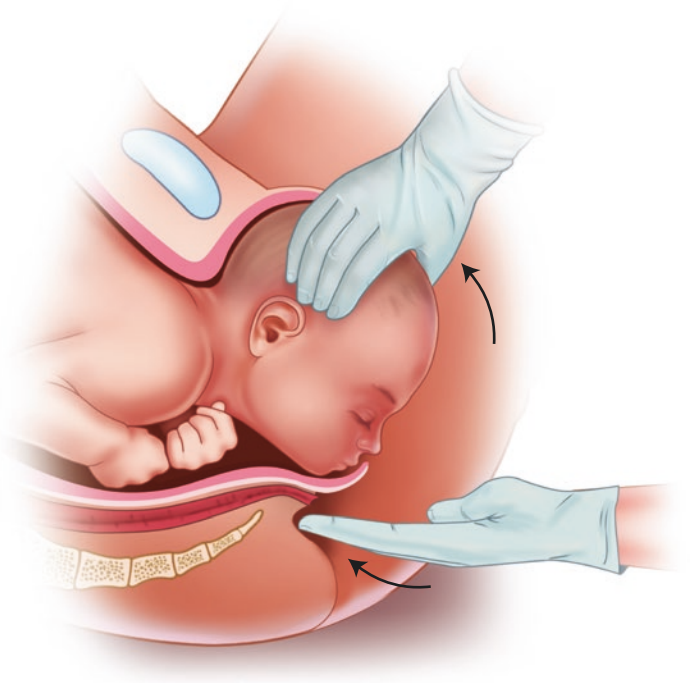

Fig. 1.1. Ritgen manoeuvre

p. 159). He instructed the pupil midwife to hold the fingers of her left hand, tips downward, over the vertex to prevent too rapid expulsion with the right hand supporting the perineum, with a clean pad covering the anus. He also described the practice of 'stripping' the perineum and 'chinning' the crowned head out which were similar to the Ritgen Manoeuvre.

During the twentieth century, most midwifery textbooks recommend some form of hand manoeuvres to protect the perineum during the second stage of labour, however due to lack of robust research evidence, most of the advice is based on the authors clinical experience, tradition or personal preference. Currently there remains lack of agreement regarding whether or not firm pressure should be applied to the fetal head to increase flexion, if the perineum should be supported and if the hands on versus the hands off or poised technique is more beneficial in preventing sever perineal trauma.

Methods Used to Restore Perineal Integrity

Sutures have been used to close wounds throughout the ages with 'eyed' needles being invented somewhere between 50,000 and 30,000 B.C. In 1600 BC the Edwin Smith papyrus shows that wounds were sewn with linen and silk thread. Other references indicate that linen strips coated with an adhesive mixture of honey and flour were used to close wounds similar to steri-strips. The writings of Hippocrates make

reference to dry wounds healing well if the edges were kept closely approximated. Reference to catgut was made in 150 AD.

In the early seventeenth century needles were inserted into each side of the perineal wound and thread was wound over the needles to bring the skin edges together. This was similar to that used by East African tribes whereby they pushed Acacia thorns through the wound and then wrapped strips of vegetation around the protruding ends, in a figure of eight fashion, to close the trauma. Similarly porcupine quills were used.

In 1904, DeLee documented that it was customary to use silkworm gut to repair a '*perineorrhaphy*' or perineal laceration and stated that it '*may be boiled with the instruments unless already sterilized'* ([7], p. 117). He also described the removal of sutures from the perineum by the '*physician'* on the tenth day following delivery and stated that *'the patient should rest quietly for several hours after the sutures are removed'* ([7], p. 197).

During the early seventeenth century, Jacques Guillemeau [21] gave an account in his book entitled '*Childbirth or the Happy Deliverie of Women*' of how he successfully repaired the severely torn perineum of a woman who was 6 weeks postdelivery and "*both paffages (passages) were brought into one*" [21]. He described how he cut away the healed skin from each side of the wound and brought the edges together by winding thread over needles which had been inserted into each side of the perineum in a similar way that an '*harelip*' would have been repaired [21, 36].

In 1859, Doctor Mackesy from Waterford, Ireland gave an account of a woman who delivered her first child assisted by forceps. During the procedure she sustained damage to the perineum, which extended into the rectum. She was confined to bed for 3 weeks and made slow recovery but at 5 weeks postpartum she complained of faecal incontinence.

He went on to described how he repaired the trauma by cutting away the healed skin edges and inserting five interrupted iron wire sutures through the wound. The ends of the wires were passed through holes in two '*leaden plates*', which were placed each side of the wound. The wires were then tightened so that the edges of the wound were brought together with the strips of lead in close apposition and pressed down to the wound and the ends were then firmly secured with spilt lead shot [2] (Fig. 1.2).

The advantage of this method was that the wires could be tightened or loosened as required and could be left in place longer than silk or cord [5]. Black [4] also advised that in '*severe cases*' that the edges of perineal or vulval lacerations should be '*kept in contact by metallic sutures*'.

At the end of the nineteenth century Jellett [25] advised that lacerations of the perineum must be sutured immediately "*to avoid the formation of a puerperal ulcer and to guard against future prolapse of the uterus*". He recommended suturing the posterior vaginal wall separately with a continuous catgut suture and then repairing the perineal trauma with interrupted silkworm gut "*as it does not absorb the discharge*". The stitches were "*entered at the side of the laceration, passed completely beneath it, and brought out at the corresponding point upon the other side*" and then tied separately. However, Herman [23] stated that a "*few complete ruptures will heal without stitches and that it is difficult for an accoucheur single-handed to accu-*

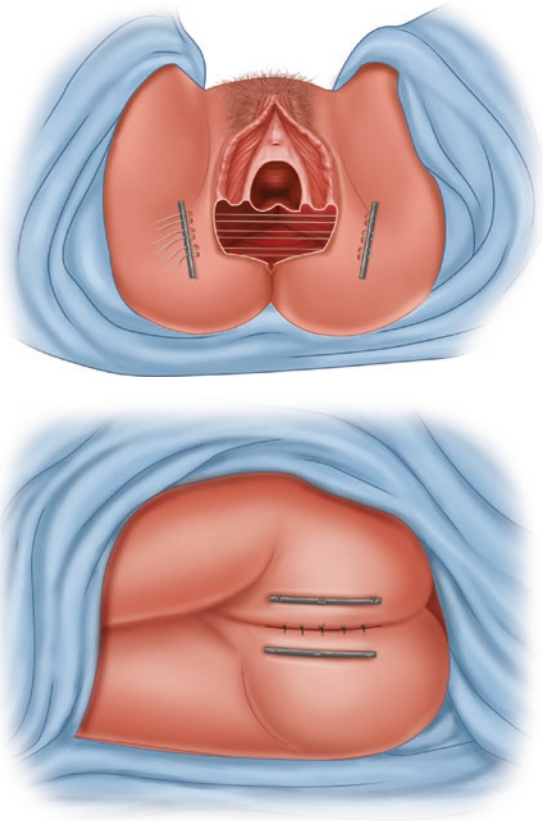

Fig. 1.2. Repair of severe perineal trauma using wire sutures and lead strips

rately sew up an extensive rent". He also commented that "*if the perineum is badly stitched, the patient is no worse off than if it were not stitched at all; and if well stitched, the patient will be saved a great deal of future annoyance*".

Herman [23] advised that the repair should be performed under ether or chloroform anaesthetic, with the patient on her back with the "*thighs bent up and held apart so you may see its full extent*". In the late nineteenth and twentieth century catgut was used to repair tears because "*you have not the trouble of taking out the stitches but can leave them to be absorbed*" [23] whereas silkworm gut sutures usually had to be removed on the seventh day [25]. It was not until 1927 that local anaesthetic (novocaine) was introduced in obstetric practice by Gellhorn to ease the pain during delivery of the fetal head and prior to performing and suturing episiotomies [37].

It was many years before perineal suturing became generally accepted. This may have been due to the fact that insertion of stitches would have been extremely painful for women because there were no local anaesthetics. Moreover, equipment was very crude, aseptic techniques did not exist and most '*midwives*' were inexperienced in carrying out this procedure successfully.

In 1930 Rucker first reported using a continuous running stitch for repair of episiotomies or tears using silk-worm gut suture material to appose the deep tissues and superficial subcutaneous layer [38]. A continuous longitudinal mattress stitch was inserted to appose the vagina and 'levator fibres' and then a second row of sutures were inserted parallel to the first layer. Using this technique, the perineum was built up layer by layer with approximately four rows of sutures being inserted.

On completion of each layer the suture material was brought out through the skin to one side of the lower end of the wound and the upper ends of the four or five separate sutures were passed through a perforated shot and secured. Rucker reported that the patients were more comfortable following repair with this technique and the "results were uniformly excellent". The repair was completed by a continuous stitch to close the superficial submucous and subcutaneous tissues.

With the continuous suture technique there are no knots and "the sutures accommodate themselves to the swelling as it occurs", also there is no 'cutting' of the tissues by the stitches. He thought that it was difficult to know just exactly how tight or loose to tie interrupted sutures in order to allow for reactionary tissue swelling. Rucker postulated that if the sutures were tied too loosely then 'primary union' would not be achieved and if they were tied too tightly they were inclined to cut into the tissues and cause increased pain when swelling occurred.

Indeed, most women who had the 'Rucker' repair were unaware of having stitches and typically responded when questioned about perineal pain "Do I have stitches?" The operators found that this method was not technically difficult to perform and the additional few minutes spent on the repair was "more than justified by the gratitude of the mother because of the elimination or decrease in perineal pain".

In 1962 Christhilf and Monias tested a modified version of the 'Rucker' method in the USA on a series of 350 cases over a twenty-four month period. Assessment of this technique by Christhilf and Monias [6] was based purely on clinical impression and they made no attempt to repeat statistical evaluation of the procedure. Many of the patients were surprised that they had stitches and "contrasted the results favourably against previous experiences".

Christhilf and Monias [6] found that the continuous technique was rapid to perform, there were no significant infections, postpartum discomfort was minimal, healing was always by first intention and there were no wound breakdown or fistulae. Indeed, one wonders why the Rucker method never achieved more widespread knowledge or acceptance and why it was not described in textbooks. However, reference was made to a particular continuous suturing method that Chassar Moir evolved which was described in '*Munro Kerr's Operative Obstetrics*' textbook as being very similar to the method of repair described by 'Stuart and Monias' (1962) [31]. Note that the reference was incorrectly cited and that it should have been 'Christhilf and Monias' [6].

In 1990, Fleming published the findings from her experience of using a simple non-locking, continuous suturing technique for all layers, with subcutaneous stitches placed well below the perineal skin surface. Previous research highlighted the technical difficulty of carrying out subcuticular suturing but Fleming reported that the continuous method was easy to perform and could be easily taught to relatively inexperienced operators (N. Fleming, 1993, personal communication). She