

INJURIES TO THE CHILD INFLICTED AT BIRTH

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THE injuries, great and small, to which the child is exposed during parturition, are very frequently met with, but the varieties of these lesions are not numerous and may easily be classified upon an etiological basis. Again and again we witness exactly the same injury occurring under the same conditions. It becomes highly important then for the obstetrician to study his cases carefully, so that he readily may comprehend the nature and cause of the lesions which he encounters, and learn to prevent them as far as possible. What renders this consideration of greater importance is the fact that we are often called upon to deliver the successive children of the same mother, all of whom are exposed to the same dangers.

Inasmuch as few of our writers on obstetrics pay much attention to the subject of these birth injuries, I have thought it would prove interesting to take up the more typical ones and consider them, as the logicians say, "*a posteriori*"—from effect to causes. As my personal observations have been somewhat limited I have borrowed most liberally from the excellent article on this subject by Prof. Küstner, of Dorpat.

Injuries occurring in cases of spontaneous birth are attended by less traumatism than is found after instrumental and manual extraction. Furthermore, the skillful obstetrician is able

to avoid many of the errors of the tyro, especially when, as in hospital practice, he is surrounded by able assistants.

INJURIES AFFECTING THE HEAD.

Slight injuries, such as erythema and abrasions of the integument, are of frequent occurrence and may be produced by contact of the head with projections into the birth-canal; they also may be caused by manual interference on the part of the obstetrician, and most of all by contact of the forceps in instrumental cases. If they are symmetrical in appearance and affect both cheeks of the child, it follows that the forceps was applied to a normally rotated head. If the marks involve one cheek or the region of the eye on one side, and the occiput or the neck on the other side, we may know that the forceps was applied to the head as it lay obliquely in the pelvis; *i. e.*, in a position of incomplete or abnormal rotation.

In non-instrumental cases, and especially in cases of contracted pelvis, the head may have undergone long continued pressure from the maternal parts, with resultant necrosis of superficial character. A study of injuries thus produced often gives us insight into the cause of the obstructed labor. The sacral promontory is the part most apt to mark the child's head. In the case of a pelvis with diminished conjugate diameter, *i. e.*, a flattened pelvis, we are very apt to find one or more marks on the head, produced in this manner. There may be merely one mark, or, if the attitude of the head was changed while at the pelvic inlet, there may be more than one. The promontory generally marks the head in the region of the parietal bone, though the cheek may also be involved. In such cases the mark on the parietal bone runs somewhat parallel with the coronal suture, the mark on the cheek being a continuation of the parietal mark, and is usually joined at an obtuse angle with the former. Such an angular mark is produced by change in the attitude of the head, the frontal mark being made first and then the child's head becoming more flexed upon the chest, the promontory marks the cheek as the head slips into the pelvic excavation. We sometimes find parallel marks on the side of the head. These may be produced by successive contacts of the head with the promontory or by pressure produced by a true and a false promontory. Sometimes in cases of flat pelvis a mark is produced upon the forehead or cheek by the pubic bones. In justo-minor pelvis

irregular atypical marks are produced, which may affect any part of the head. In cases where the child is extracted by the breech, we do not so often find these pressure marks, for in those cases the head, as a rule, passes through the pelvis much more rapidly than in cephalic presentations.

CAPUT SUCCEDANUM.

This is a serous infiltration of the presenting part of the child. It appears most often upon the scalp, but the term is also employed in connection with swellings upon the face or buttocks when these are the presenting parts. The condition is one of little importance to the well being of the child, but it affords the obstetrician a useful sign in estimating the progress and character of the labor. In left occipito-posterior presentations it is found at the right anterior part of the head; in right anterior presentations it is found at the left posterior part of the head, etc. The caput succedaneum rarely appears until the membranes are ruptured and is more marked in proportion to the duration of labor.

CEPHALHEMATOMA.

This is a tumor produced by escape of blood between the pericranial membrane and the underlying bone. While seldom causing any difficulties, it presents many points of interest. It is to be noted that it is usually single, rarely double; that it is confined to that bone in which it originated because the pericranium is more firmly attached at its borders, hence the tumor does not cross a suture. The effused blood in the tumor may remain fluid for weeks.

Concerning the mechanism of its production we find several theories: Some regard it as the result of pressure on the part of the cervix; others as the result of pressure exercised by any part of the birth canal. Fritsch is of the opinion that the trauma involved in its production occurs at the moment when, the labor pain ceasing, recession of the head takes place, the head itself receding, while the pericranium is sufficiently held by the walls of the birth canal to cause rupture of the pericranial vessels and a gradual stripping off of the pericranium itself. This theory suffices to explain the presence of cephalhematoma after easy labors and also its relative frequency of appearance over the right parietal bone.

Küstner believes that a certain number of cephalhematomata

are caused by a minute fracture of the cranial bones because in cases of important cranial fractures a subperiosteal hemorrhage usually occurs. Furthermore, the peculiar radiating structure of the bones of the head renders them especially vulnerable as seen most markedly in the case of premature children. Cephal-hematomata are sometimes formed at the point where the apex of the forceps has impinged upon the bone and likewise where a cranial bone has been exposed to fracture by pressure upon the pelvic bones. Finally, autopsies have revealed subcranial hemorrhages corresponding with external hematomata, and in some of these cases a traumatic injury of the bone was found while in other cases there was a congenital non-traumatic fissure of the bone. Cephalhematomata so seldom cause trouble that it is usually advised to employ no treatment for their cure, though some have resorted to aspiration followed by compressive bandaging. When resorption of the effused blood begins, new bone is formed around the periphery of the tumor, the latter itself becoming softer. One often obtains upon examination a feeling as though there were present a depressed fracture of the skull. I have several times seen these mistakes made by internes and others and can now recall two cases of hematoma occurring in children several years of age where operation had been advised for the purpose of raising a supposedly depressed bone. One case was that of a child 4 years of age who had fallen from a moving carriage. After some days the child was brought to me. The mother stated that a physician had advised trephining. I found a soft, moderate sized tumor with a raised edge formed by the new deposit of bone. I advised no active treatment and the tumor disappeared in a short time. Another case was that of a six-year old boy who had fallen from his bicycle to a stone pavement, sustaining a severe contusion upon the forehead. A very large hematoma had formed and a physician, after unsuccessfully attempting to remove the blood by aspiration, had advised trephining. I advised making moderate compression of the tumor by bandaging, which appeared to facilitate resorption. In later years this child suffered from purpura hemorrhagica in aggravated form.

DEPRESSIONS IN CRANIAL BONES.

We encounter two forms—the deep spoon-shaped and the shallow gutter-shaped depressions. The shallow depressions are most frequently found in cases of flat pelvis, and generally

are located on the parietal bone. They are caused by pressure from the promontory, which usually leaves a mark upon the corresponding portion of the scalp. The deep depressions are also caused by the promontory, and are most apt to be found after rapid deliveries, and especially in cases of manual or instrumental delivery. The regions of the head most often affected are the frontal eminence, the parietal eminence, and the parietal bone near the coronal suture. Depressions over the frontal eminence correspond with the forecoming head. Depressions over the parietal eminence correspond with the aftercoming head, while depressions near the coronal suture may be found in both varieties. The coccyx has been known to cause a deep depression. Use of the forceps is a most frequent cause of these depressions, and especially so in cases of the high operation, where the head is necessarily grasped in an asymmetrical manner. Such a case has been described where severe pressure over the frontal bone caused the eye to protrude from its socket. The cranial bones of the new born being exceedingly fragile, depressions are often accompanied by slight fractures affecting more often merely the external table. These injuries do not generally affect vital organs, even the vessels escaping injury, but such a lesion in the temporal region is apt to produce rupture of the meningeal vessels. Disturbances of the central nervous system are seldom produced by even quite deep depressions, and after a few weeks the depressions become shallower, but do not entirely disappear.

As regards attempts to elevate the depressed bone, it is agreed by the authors that inasmuch as severe results seldom follow the injury, the cure is apt to be worse than the disease, and non-operative interference is the safer plan. The harmless advice to attempt the elevation of the bone by means of an air pump has produced but small results.

CRANIAL FRACTURES AND SEPARATION OF CRANIAL SUTURES.

These occur especially in cases of difficult forceps operations, and in cases of manual extractions. They are always accompanied by an extracranial hematoma and generally by an intracranial one as well. When the bones are torn apart at the sutures, there may be laceration of the subjacent sinus with the production of enormous hemorrhage. The above injuries, when caused by the forceps, generally affect the frontal bone; when caused by the promontory, the seat of injury may be

at the parietal or frontal bone. Fracture of the occipital bone is especially associated with extraction of the aftercoming head.

In one of the Vienna clinics I once witnessed a difficult case of version and extraction, in which the child suffered an extensive fracture of the temporal from pressure of the promontory. The child was born dead.

Injuries at the base of the skull are rare and consist mainly in separation of the squamous portion of the occiput from the condyloid portion.

RUPTURE OF INTRACRANIAL VESSELS.

Such injuries are of frequent occurrence, their importance depending upon the locality and extent of the resultant hemorrhage; hemorrhage at the base of the brain being particularly fatal, while hemorrhage in other localities may result in asphyxia of greater or less degree. Laceration of the transverse sinus is usually caused by separation of the parietal bone from the temporal bone, while the longitudinal sinus is lacerated by the tearing asunder of the bones which bound the parietal or sagittal suture. Laceration of the sinuses may occur without separation of the corresponding sutures, owing to the greater elasticity of the soft parts of the sutures in comparison with the walls of the sinuses. Hemorrhages have been observed in cases where, during birth, the circulation was impeded by pressure on the jugular or obstruction to the circulation in the cord.

INJURIES OF THE FACE.

Fracture of the nasal bones may readily be produced by the forceps but has also occurred at spontaneous births. Injuries about the mouth such as lacerations at the angle of the mouth, lacerations of the tongue, dislocations and fractures of the jaw, may all be produced by attempts to extract the aftercoming head in the maneuvers accompanying the Mauriceau grip.

INJURIES OF THE NECK.

Striæ are sometimes found upon the skin of the neck, the part most exposed to stretching being the seat of lesion as occurs in face presentations. Hematomata of the muscles of the neck when found are usually in the sterno-cleido-mastoid muscles. Such hemorrhages may be produced by pressure of the forceps

or the operator's fingers against the sides of the neck or by twisting and stretching of the muscles as occurs in extraction by the breech when rotation of the head does not keep up with that of the shoulders. It is known that many of these hematomata disappear without leaving sequelæ, but it is also probable that certain cases of wry neck are directly ascribable to this cause.

DIVULSION OF THE VERTEBRÆ.

Aside from decapitation of the child there is a class of vertebral injuries which have been described both as fractures and ruptures of the vertebræ. The cervical region is the one most apt to be involved, and one or more of the vertebræ may be involved. The typical injury is separation of the upper or lower epiphysis, rupture of the ligaments rarely occurring, the rule being that in all parts of the new born the sutures are weaker than the ligaments. The chief cause of the injury is traction upon the head or body before the soft parts are well prepared, as in a case of version and extraction, where the head is incarcerated by an undilated cervix. The injuries are generally accompanied by hemorrhage into the membranes of the cord. In the lower part of the trunk the sacro-iliac articulation is the most vulnerable point.

INJURIES OF THE SECUNDINES.

As regards the funis, injuries may be caused by tension or pressure. The chief predisposing causes of division of the cord are velamentous insertion of the same and abnormal shortness. In the former case the vessels of the funis may be opened by rupture of the membranes. With regard to abnormal shortness of the funis this may be absolute or relative, the latter being the case when the cord is wound around some part of the child. If the cord is shorter than ten inches, then when the child is expelled either the placenta is loosened by traction or the cord is torn across. Injuries of the cord are especially liable to occur in cases of precipitate labor. It has been found that the cord is able to sustain a weight of about eleven pounds and it is therefore probable that in most cases of labor if the child were to fall to the floor its momentum would suffice to rupture the cord. Hemorrhage seldom occurs under such circumstances both on account of the laceration of the vessels

and because of the fact that blood pressure is lowered in the cord as soon as the respiratory movements of the child begin.

INJURIES OF THE EXTREMITIES.

The most common injury of the upper extremities is fracture of the clavicle. The clavicle may be fractured by direct or indirect force. It may be fractured by direct force when in extraction by the breech the shoulder is pulled down to render the arm accessible, or after extraction of the arms it may be fractured by direct pressure made with the fingers against the bone in the endeavor to deliver the head. I think fracture is often produced by traction made upon the head in the endeavor to deliver the shoulders. In this maneuver the head is forced backward so as to bring the anterior shoulder under the pubic arch. This places the clavicle of the posterior shoulder in a position that renders it peculiarly liable to fracture. Indirect force may also be applied by pressure made upon the shoulder by the hand introduced for the purpose of bringing down an arm, or it may be made by traction on the humerus. The fracture usually occurs at the junction of the inner $\frac{2}{3}$ with the outer $\frac{1}{3}$ of the clavicle. Such fracture in the new-born child appears to cause it but little pain. A suitably adjusted bandage is well borne and satisfactory union is easily obtained.

FRACTURES OF THE HUMERUS.

These are almost always produced by direct force made in releasing the arm in extraction by the breech and particularly so when the attempt is made with one finger, as should not be done.

An equally frequent injury is separation of the epiphyseal end of the humerus at the shoulder. Of special interest is the fact that such injury is apt to be overlooked or mistaken for dislocation, fracture of the neck of the scapula, or most often of all, a nerve lesion. Quite a moderate degree of force suffices to produce this injury, it having been found that a weight of 4-5 kilograms applied to the humerus in a transverse direction is all that the bone is capable of withstanding, while all movements, especially those of rotation, which, in the adult, produce luxation, in the child cause separation of the epiphysis. In injuries of this sort the periosteum is usually torn, and through the opening the diaphysis protrudes, being palpable below the coracoid process or glenoid cavity. The end of the dia-

physis covered by the soft tissues has a rounded feel, and may be mistaken for the dislocated head of the bone, the deception being increased by the changed direction of the axis of the arm. The rounded contour of the shoulder is preserved and affords one of the most valuable signs in making a diagnosis. A striking symptom is the attitude of the arm, which is rotated inward to an extreme degree. The upper fragment, on the contrary, is rotated outward. Union of the fragments in these positions is naturally attended with disastrous results. In older children the inward rotation of the lower fragment is less marked, or even absent, owing to anatomical reasons.

The treatment is such as belongs to the domains of surgery and neurology. The first thing to accomplish is the reduction of the deformity, by bringing the fragment back through the periosteum. The next point is to secure proper union of the epiphysis, which is rotated outward with the diaphysis, which is rotated inward. The forearm should be supinated, then flexed upon the injured upper arm so that the hand rests upon the shoulder. A pad is then placed in the axilla and the forearm and upper arm fixed upon the thorax. The best results, however, are probably obtainable by securing the epiphysis to the diaphysis by means of pegs. For the paralysis, electrical treatment should be begun early. If the injury is caused by pressure of a displaced fragment, electrical treatment is of course useless, until the pressure of the bone is released.

DISLOCATIONS.

We need not concern ourselves greatly with these, because to whatever injury the new-born child is subjected, the suture gives way before the ligaments do. So we may say that epiphyseal separations in the new-born correspond to luxations in the adult. Duchenne described a number of cases, which he regarded as examples of shoulder dislocation, but which Küstner considered to be examples of epiphyseal separation.

INJURIES OF THE LOWER EXTREMITIES.

Excoriations, bruises and deeper wounds may be produced by version and extraction, particularly when the fillet is used. Bone injuries are uncommon, though many varieties have been described. Epiphyseal separations occur in the upper and lower ends of the leg and at the lower end of the femur. Cases of epiphyseal separation have been described where the legs

were so twisted that the feet were turned backward. Inasmuch as it is never necessary to exert force upon the leg in any direction but a longitudinal one for traction purposes, the existence of such injuries is *prima facie* evidence of bad practice. The causes of these injuries are twisting forces and hyperextension, the former of which produces separation of the epiphysis, while the latter may also result in fracture. The least vulnerable point is the lower suture of the femur, the most vulnerable the epiphysis of the leg.

In extraction of the hip, instrumental or otherwise, if the hook or finger employed is not properly applied at the flexure, it is apt to slip off and produce a fracture of the upper one-third of the femur. The femur, like most of the bones of the newborn child, breaks transversely without splintering. In the treatment, extension is as desirable as in the adult. Crede's plan is to flex the thigh upon the body and secure it to the trunk a procedure less difficult, because these fractures occur generally in children born by the breech, who have long been used to carry their legs in this position.

Diaphysis divulsion at the upper end of the femur is scarcely possible, owing to the manner in which the bone is dove-tailed into the cartilage. The only way in which it would be likely to be produced would be by a forced movement such as in the adult produces anterior dislocation, *i. e.*, abduction with outward rotation as might be produced in an awkward version.

Dislocations of the hip joint by obstetrical maneuvers have been described, but are exceedingly rare, although Stromeyer reported twenty cases observed by him. It is only possible when with the thigh flexed as in a breech presentation great force is exerted upon the neck of the femur which still appertains to the epiphysis. In this way an iliac luxation might be produced, though the neck of the femur has been shown to be capable of sustaining a weight of thirty to forty kilos without injury to the joint. As soon as force is exerted upon the diaphysis such movements as in the adult would produce luxation in the child cause epiphyseal separation.

BIRTH PARALYSES.

These are cerebral, spinal and peripheral in their origin. They are caused generally by meningeal, less often by cerebral hemorrhage produced by pressure upon the skull, either in normal or instrumental labor. According to Cruveilhier one-third of the

deaths during parturition are ascribable to this cause. The chief etiological factor in the production of these hemorrhages is anything that causes unusual pressure upon the child's brain. Hence they predominate in children of primiparæ and in cases of tedious labor, premature labor, extraction of the after-coming head, forceps extraction, etc., although it is also true that well-advised forceps operations may sometimes prevent such accidents. Cerebral hemorrhage occurs in the great majority of still-born children, and is the common cause of asphyxia neonatorum. As a rule the hemorrhage is at the base of the brain in head presentations and at the vertex in breech presentations. The result of the hemorrhage depends largely upon its extent, though even very large hemorrhages are not incompatible with prolonged life.

According to Church and Peterson the injuries produced by hemorrhages lead to meningo-encephalitis, sclerosis, cyst formation and atrophies. The birth paralyses are usually of the bilateral type, in contradistinction to those of later origin. If the injury to the brain centers be extensive the child is apt to be born dead or profoundly asphyxiated; if the child recovers from the asphyxia convulsive symptoms appear in a few hours or days. In still other cases the injury is not manifested until weeks or months after birth.

The pathological conditions present in all cases of cerebral paralysis are, first, a lesion of the brain usually involving some portion of the motor tract, and, second, atrophy and retarded development of the brain with descending degeneration of the lateral columns of the cord and pyramidal tracts. In the cerebral paralysis of these cases of early origin there is apt to be more mental involvement than in those of later development. The child is irritable and is specially prone to all the functional disorders of early childhood. If the lesion is cortical, epileptic convulsions are common. At the time of dentition the eruption of a tooth is often accompanied by convulsions. The muscles respond to electrical stimulus. The child learns to walk later and then exhibits a peculiar spastic gait due to rigidity of the muscles and spasmodic contractions of the flexors and adductors. The child rises upon the toes and the knees knock together or the legs cross each other as the child advances. Incoordinate movements often occur in the paralyzed limbs when voluntary efforts are made or the continuous movements of athetosis may be witnessed. I have seen cases when all the voluntary

muscles of the body seemed to be agitated by the child's efforts in walking and talking. With all these drawbacks to health such children may maintain a fair degree of growth in spite of the atrophy of various muscles, particularly those of the legs.

PARALYSIS OF THE UPPER EXTREMITY.

Aside from paralyzes of central origin we also find severe injuries of nerves following bone lesions, such as fractures and separation of the epiphyses when the displaced bone presses upon a nerve or a plexus of nerves. Such nerve insults are constant accompaniments of the above-described bone injuries. In the case of the upper end of the humerus Duchenne always found in the cases which he called upper arm dislocations (and which Küstner regarded as epiphyseal separation), a concomitant paralysis caused by lesion of the brachial plexus. Duchenne described a kind of paralysis which he observed in cases where there had been either a difficult extraction of the arm or where the body of the child had been delivered by violent traction, made by hooking the fingers into the axillæ. Duchenne's patients were all seen by him long after the infliction of the injury. The symptoms were always uniform. Exaggerated inward rotation of the humerus with the hand in pronation; paralysis of deltoid, infraspinatus, biceps and brachialis anticus. The muscles did not respond to the Faradic current. Duchenne not having established the lesion, other writers attributed it to injury of the suprascapular nerve. Seeligmüller says the infraspinatus muscle is paralyzed by pressure made upon the nerve which supplies it, *i. e.*, the suprascapular nerve, which is very superficial, and as well as the muscle itself, is exposed to direct pressure against the bones. Küstner says that even if the nerve were superficial, which he denies, he fails to see how one, by hooking his fingers into the axillæ, could possibly injure the nerve in question.

Erb described a paralysis in which the deltoid, biceps, brachialis anticus, supinator longus and infraspinatus were all affected. Erb also described a spot above the clavicle where the brachial plexus could be irritated and all the above-named muscles would be affected. This seemed to offer an explanation of the paralysis, and Erb expressed the opinion that it was produced by the Prag grip, to which Küstner objected that at the time Erb gave his opinion the Prag grip was obsolete. It is also objected that if the paralysis is caused by any of the class-

ical grips Prag, Mauriceau or Smellie-Veit, why is it found on one side only? Schultz's opinion was that in the effort to extract the arm or child the position of the arm was such as to force the clavicle against Erb's point. One of the most remarkable features of this paralysis is the persistency of the injury and the subsequent atrophy, while in Bell's paralysis permanent injury seldom occurs, though in this case the conditions are most favorable. Küstner is of the opinion that most of the birth paralyzes of the upper extremities are the results of unrecognized separation of the epiphysis of the humerus with or without protrusion of the diaphysis through the periosteum. At all events, all the severe cases of this sort which he has seen showed recent or badly united epiphyseal-diaphyseal fracture.

Sometimes light cases of this paralysis are seen, which appear to be cases of nerve injury, caused by pressure of a hematoma in the shoulder region, as has been demonstrated by Fritsch.

There are recent contributions to this subject to which I have not had access. Thus, some French writers claim to have demonstrated that the lesion involved in the production of this paralysis consist in an actual separation of the roots of the nerve near the spinal cord.

Two cases of Erb's paralysis, which occurred in my own practice, may be of interest in this connection. The mother of one of these children had given birth to a child now living, which was born about ten years ago. The labor, in which I attended her, was somewhat protracted because of the failure of the head to engage. The latter was in the left occipito posterior position. I corrected the presentation manually and without difficulty. I then applied the forceps and delivered the head quickly and easily. The child showing marked symptoms of asphyxia, I did not dare await spontaneous expulsion of the child's body. I therefore proceeded to extract the shoulders. This was done by forcing the head back toward the perineum to draw the anterior shoulder under the pubic arch. The extraction of the shoulders was accomplished with much difficulty. The child was deeply asphyxiated when finally born, but was resuscitated after some minutes. It was a large, well developed, vigorous girl. A few days later it was noticed that the child suffered considerable pain and was not tolerant of pressure made on the right side of the neck, and also that whereas the left arm was freely moved, the right hung limp at the side. The only injury discoverable was a small swelling back of the

ear, at the point where pressure is apt to cause Bell's paralysis, of which, however, there was no sign. A little later still in the case, all the symptoms of Erb's paralysis were present. A neurologist who saw the case with me when the child was about three months old made a bad prognosis, but I am pleased to state that after a few months the child had greatly improved, and that at present most of the motions of the arm are normal. My own impression in this case is that I injured the brachial plexus in my efforts to release the shoulders, although the maneuver made was, I believe, a perfectly justifiable one; furthermore, I employed no more force in its execution than I often have used in similar extractions.

The second case referred to was that of a child whose mother I had attended in three previous labors. This woman is large, strong and healthy, but has a flattened pelvis, the result of rickets. When her first child was born the first stage of labor lasted three days. The child was delivered with great difficulty, by means of a high forceps operation. The child lived ten days and died of convulsions, produced, no doubt, by cerebral hemorrhage. In the second labor I had to deal with a breech presentation, which I converted into a footling. The extraction was very difficult, but the child is still living and is healthy and vigorous. The third labor was similar to the first. The first stage of labor having extended over two days, and being very exhausting to the patient, I dilated the cervix manually, and with great difficulty made a version. The extraction proved still more difficult, and while the head was still undelivered the woman nearly succumbed to the anesthetic. I was obliged to resuscitate the mother. When this was accomplished I completed the extraction and found the child dead.

The fourth labor was similar to the third except that the first stage was shorter. On this occasion I was better provided with assistants but experienced the same difficulties in the delivery, which was accomplished by version as before. This child is now about one and one-half years old. It was noticed about one week after its birth that it did not use its left arm as freely as the right, and after a few weeks more a diagnosis of Erb's palsy was clearly made out. The lesions in this case, however, were less severe than in the case already cited, and improvement has been so satisfactory that I believe the recovery will be complete if it is not so at this time. In my opinion

the injury to the nerves was inflicted by the efforts made in extracting the head.

In this connection I wish to state that I believe it would have been more prudent to have induced premature labor in the last two instances. The following considerations, however, induced me to act as I did. First, I have observed in similar cases that successive labors have been progressively easier. Second, I had hoped to render labor easier by placing the mother upon a strict diet during the latter part of gestation, which was done. Third, by providing myself with more assistants I believed I would be able to deliver with more facility.

CENTRAL PARALYSIS OF MOTOR NERVES OF THE FACE.

This is caused by hemorrhage at the base of the brain, generally from a fracture of one of the cranial bones. In cases of this sort, then, and especially when in addition we have to deal with a profound asphyxia, we may suspect hemorrhage at the base of the brain interfering with the normal function of the medulla.

PARALYSIS FROM INJURY OF PERIPHERAL NERVES OF THE HEAD.

Of these the most common is Bell's paralysis of the facial nerve, caused by pressure of the forceps against the nerve in its exit from the stylo-mastoid foramen as often happens when the forceps grasps the head in an asymmetrical manner. The symptoms are exceedingly characteristic, for the paralyzed side of the face remains persistently immobile, with the eye wide open, producing a marked contrast with the uninjured side, especially when the child cries. The prognosis is particularly favorable and the function of the muscles is soon restored, notwithstanding the fact that the affected nerve has been subjected to compression between the hard temporal bone and the apex of the forceps. It is to be observed that the forceps whose apices turn in sharply and closely approximate each other is the instrument which is most apt to produce injury of the facial nerve. In my own practice I avoid such an instrument and also take the additional precautions of keeping the apices somewhat further apart by inserting a folded towel between the handles of the instrument.

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