



## Skull Fractures and Birth Trauma

**Date of Search: 29-30 June 2016**

**Sources Searched: Medline, Embase, Google Scholar**

### Search History:

1. Medline; (fracture\* adj2 skull\*).ti,ab; 3110 results.
2. Medline; exp SKULL FRACTURES/; 19783 results.
3. Medline; 1 OR 2; 21257 results.
4. Medline; Ventouse.ti,ab; 255 results.
5. Medline; "vacuum-assisted vaginal deliver\*".ti,ab; 39 results.
6. Medline; "vacuum extraction\*".ti,ab; 1033 results.
7. Medline; exp VACUUM EXTRACTION, OBSTETRICAL/; 1126 results.
8. Medline; 4 OR 5 OR 6 OR 7; 1892 results.
9. Medline; 3 AND 8; 60 results.
10. Medline; (incidence OR prevalence).ti,ab; 971908 results.
11. Medline; exp INCIDENCE/; 203965 results.
12. Medline; exp PREVALENCE/; 218608 results.
13. Medline; 10 OR 11 OR 12; 1111591 results.
14. Medline; 9 AND 13; 11 results.
15. EMBASE; (fracture\* adj2 skull\*).ti,ab; 3302 results.
16. EMBASE; exp SKULL FRACTURES/; 20903 results.
17. EMBASE; 15 OR 16; 21749 results.
18. EMBASE; Ventouse.ti,ab; 393 results.
19. EMBASE; "vacuum-assisted vaginal deliver\*".ti,ab; 72 results.
20. EMBASE; "vacuum extraction\*".ti,ab; 1233 results.
21. EMBASE; exp VACUUM EXTRACTION, OBSTETRICAL/; 2114 results.
22. EMBASE; 18 OR 19 OR 20 OR 21; 2916 results.
23. EMBASE; 17 AND 22; 69 results.
24. EMBASE; (incidence OR prevalence).ti,ab; 1304746 results.
25. EMBASE; exp INCIDENCE/; 308868 results.
26. EMBASE; exp PREVALENCE/; 506500 results.
27. EMBASE; 24 OR 25 OR 26; 1526066 results.
28. EMBASE; 23 AND 27; 17 results.
29. EMBASE; "manual rotat\*".ti,ab; 143 results.
30. EMBASE; 17 AND 29; 2 results.
31. EMBASE; (cranial adj2 fracture\*).ti,ab; 391 results.
32. EMBASE; 22 AND 31; 2 results.
33. Medline; "manual rotat\*".ti,ab; 101 results.
34. Medline; 3 AND 33; 1 results.
35. Medline; (manual\* adj2 rotat\*).ti,ab; 238 results.

36. Medline; 3 AND 35; 2 results.
37. Medline; "head rotation".ti,ab; 1144 results.
38. Medline; 3 AND 37; 1 results.
39. EMBASE; (manual\* adj2 rotat\*).ti,ab; 254 results.
40. EMBASE; "head rotation".ti,ab; 1346 results.
41. EMBASE; 39 OR 40; 1595 results.
42. EMBASE; 17 AND 41; 4 results.
43. EMBASE; (spontaneous\* adj2 vagina\*).ti,ab; 2059 results.
44. EMBASE; 17 AND 43; 13 results.
45. EMBASE; exp VAGINAL DELIVERY/; 21739 results.
46. EMBASE; 17 AND 45; 50 results.
47. Medline; (spontaneous\* adj2 vagina\*).ti,ab; 1496 results.
48. Medline; ((vagina\*) adj2 (birth\* OR deliver\*)).ti,ab; 15278 results.
49. Medline; 47 OR 48; 15418 results.
50. Medline; 3 AND 49; 23 results.
51. Medline; (depress\* adj2 "skull fracture").ti,ab; 297 results.
52. Medline; (linear adj2 "skull fracture").ti,ab; 72 results.
53. Medline; 51 OR 52; 356 results.
54. Medline; exp OBSTETRIC LABOR COMPLICATIONS/; 58311 results.
55. Medline; "birth trauma".ti,ab; 931 results.
56. Medline; "birth injur".ti,ab; 943 results.
57. Medline; 54 OR 55 OR 56; 59796 results.
58. Medline; 53 AND 57; 9 results.
59. Medline; BIRTH INJURIES/; 4728 results.
60. Medline; 53 AND 59; 15 results.
61. EMBASE; (depress\* adj2 "skull fracture").ti,ab; 351 results.
62. EMBASE; (linear adj2 "skull fracture").ti,ab; 84 results.
63. EMBASE; 61 OR 62; 425 results.
64. EMBASE; "birth trauma".ti,ab; 1194 results.
65. EMBASE; "birth injur".ti,ab; 1042 results.
66. EMBASE; BIRTH INJURIES/; 3334 results.
67. EMBASE; exp LABOR COMPLICATION/; 151449 results.
68. EMBASE; 64 OR 65 OR 66 OR 67; 155121 results.
69. EMBASE; 63 AND 68; 12 results.
70. EMBASE; (neonat\* OR newborn OR infan\*).ti,ab; 656353 results.
71. EMBASE; 63 AND 70; 74 results.
72. Medline; (neonat\* OR newborn OR infan\*).ti,ab; 571334 results.
73. Medline; 53 AND 72; 71 results.
74. Medline; manoeuvre\*.ti,ab; 5625 results.
75. Medline; 3 AND 59 AND 74; 2 results.
76. Medline; 3 AND 57 AND 74; 2 results.
77. EMBASE; manoeuvre\*.ti,ab; 7344 results.
78. EMBASE; 17 AND 68 AND 77; 1 results.
79. EMBASE; "manual rotation".ti,ab; 132 results.
80. EMBASE; VACUUM/; 8166 results.
81. EMBASE; 17 AND 80; 17 results.
82. EMBASE; "Occiput Posterior".ti,ab; 222 results.

83. EMBASE; "Transverse Position\*".ti,ab; 181 results.
84. EMBASE; 82 OR 83; 383 results.
85. EMBASE; 17 AND 84; 2 results.
86. EMBASE; (instrumental adj2 rotat\*).ti,ab; 20 results.
87. EMBASE; 17 AND 86; 1 results.
88. Medline; "Occiput Posterior".ti,ab; 191 results.
89. Medline; "Transverse Position\*".ti,ab; 179 results.
90. Medline; (instrumental adj2 rotat\*).ti,ab; 18 results.
91. Medline; 88 OR 89 OR 90; 370 results.
92. Medline; 3 AND 91; 0 results.
93. Medline; ("subarachnoid hemorrhage" OR "subarachnoid haemorrhage").ti,ab; 18942 results.
94. Medline; exp SUBARACHNOID HEMORRHAGE, TRAUMATIC/; 193 results.
95. Medline; 93 OR 94; 19013 results.
96. Medline; 3 AND 95; 170 results.
97. Medline; (neonat\* OR newborn OR infan\*).af; 1319261 results.
98. Medline; 96 AND 97; 40 results.
99. EMBASE; ("subarachnoid hemorrhage" OR "subarachnoid haemorrhage").ti,ab; 24341 results.
100. EMBASE; exp SUBARACHNOID HEMORRHAGE, TRAUMATIC/; 33480 results.
101. EMBASE; 99 OR 100; 36659 results.
102. EMBASE; (neonat\* OR newborn OR infan\*).af; 1263511 results.
103. EMBASE; 17 AND 101 AND 102; 121 results.
104. EMBASE; 17 AND 66 AND 101; 10 results.
105. EMBASE; 66 AND 100; 23 results.
106. Medline; 59 AND 95; 12 results.
107. Medline; 57 AND 95; 21 results.
108. EMBASE; \*SKULL FRACTURE/; 4456 results.
109. EMBASE; 66 AND 108; 21 results.
110. Medline; exp SKULL FRACTURE, DEPRESSED/; 157 results.
111. Medline; 57 AND 110; 2 results.
112. Medline; 59 AND 110; 3 results.
113. Medline; \*SKULL FRACTURES/; 6433 results.
114. Medline; 59 AND 113; 63 results.
115. Medline; exp SKULL/IN [IN=injuries]; 183859 results.
116. Medline; ((skull OR cranial) adj2 injur\*).ti,ab; 2576 results.
117. Medline; 8 AND 116; 7 results.
118. Medline; 35 AND 116; 0 results.
119. EMBASE; exp SKULL INJURY/; 22763 results.
120. EMBASE; 22 AND 119; 65 results.
121. EMBASE; 45 AND 119; 50 results.
1. Medline; (skull adj2 fractur\*).ti,ab; 3101 results.
2. Medline; exp SKULL FRACTURES/; 19784 results.
3. Medline; 1 OR 2; 21253 results.
4. Medline; (vagina\* adj2 delivery).ti,ab; 10307 results.
5. Medline; 3 AND 4; 21 results.
6. EMBASE; (skull adj2 fractur\*).ti,ab; 3289 results.

7. EMBASE; exp SKULL FRACTURES/; 20903 results.
  8. EMBASE; 6 OR 7; 21742 results.
  9. EMBASE; (vagina\* adj2 delivery).ti,ab; 14924 results.
  10. EMBASE; 8 AND 9; 34 results.
  11. EMBASE; ("ping pong" adj2 fracture\*).ti,ab; 26 results.
  12. Medline; ("ping pong" adj2 fracture\*).ti,ab; 20 results.
  13. Medline; exp SKULL/; 183873 results.
  14. Medline; exp FRACTURES, BONE/; 156863 results.
  15. Medline; ("birth injur\*" OR "birth trauma").ti,ab; 1807 results.
  16. Medline; exp BIRTH INJURIES/; 5207 results.
  17. Medline; 15 OR 16; 6080 results.
  18. Medline; 13 AND 14 AND 17; 57 results.
  19. EMBASE; exp SKULL/; 176818 results.
  20. EMBASE; exp FRACTURES, BONE/; 227821 results.
  21. EMBASE; ("birth injur\*" OR "birth trauma").ti,ab; 2156 results.
  22. EMBASE; exp BIRTH INJURIES/; 5504 results.
  23. EMBASE; 21 OR 22; 6256 results.
  24. EMBASE; 19 AND 20 AND 23; 0 results.
  25. EMBASE; 19 AND 20; 8893 results.
  26. EMBASE; 23 AND 25; 39 results.
  27. EMBASE; \*SKULL INJURY/; 627 results.
  28. EMBASE; 23 AND 27; 7 results.
  29. EMBASE; \*SKULL FRACTURE/; 4456 results.
  30. EMBASE; \*SUBARACHNOID HEMORRHAGE/; 16431 results.
  31. EMBASE; 29 AND 30; 25 results.
  32. EMBASE; 22 AND 30; 8 results.
  33. EMBASE; 27 AND 30; 7 results.
  34. Medline; \*SUBARACHNOID HEMORRHAGE/ OR \*SUBARACHNOID HEMORRHAGE, TRAUMATIC/; 12749 results.
  35. Medline; 3 AND 34; 61 results.
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**Title:** Craniocerebral birth injuries in term newborn infants: A retrospective series

**Citation:** Child's Nervous System, October 2015, vol./is. 31/10(1982), 0256-7040 (October 2015)

**Author(s):** Pieter N., Van Calenbergh F., Lieven L.

**Language:** English

**Abstract:** Objective: In an attempt to further define the spectrum of cranial birth injuries, we analyzed 21 consecutive cranial birth injuries seen at our institution. Methods: We performed a retrospective chart review from the medical records of our department from 1994 to 2015. We included 21 infants of 36 weeks gestational age or older with a diagnosis of cranial birth injury (severe cephalhematoma, skull fracture including growing fracture,

epidural, subarachnoid and subdural hemorrhage, intracerebral and intraventricular hemorrhage and other types of brain injury). Types of injuries and their locations, presenting signs and symptoms and their timing, and what treatment(s), if any, were required, were recorded. Various maternal and neonatal factors (Apgar scores at 1 and 5 minutes, gestational age, birth weight, birth length, head circumference and parity) and the mode of delivery (spontaneous vaginal delivery, elective C-section, urgent C-section, use of forceps or vacuum extraction) were recorded. Results: The most common initial presentations were swelling of the skull (43% of cases) and seizures (19% of cases). Average Apgar scores were 6.45 at 1 min and 8.4 at 5 min; 48% of children had abnormally low Apgar scores at 1 min. The most common intracranial lesion were skull fractures (33%). Neurosurgical treatment was required in 11 infants (52%). One infant in our series died. Assisted mechanical delivery by either forceps and/or vacuum extraction occurred in 43% of infants. In comparison, in the year 2013 only 13.97% of deliveries at our institution were mechanically assisted. Conclusion: Although this series is too small to make firm conclusions, it is remarkable that the rates of assisted mechanical deliveries in our series far exceeded the rates at our institution in the year 2013.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Springer Link Journals* in [Child's Nervous System](#)

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**Title:** Indications and risks of vacuum assisted deliveries

**Citation:** Journal International Medical Sciences Academy, October 2013, vol./is. 26/4(213-214), 0971-071X (October-December 2013)

**Author(s):** Hafeez M., Badar N., Yasin A.

**Language:** English

**Abstract:** The aim of the study was to find out the percentage of vacuum assisted deliveries, indications of its application and related complications. It was a prospective observational study. The study was carried out in department of obstetrics and gynaecology at Sharif Medical City Hospital, from 1st November 2010 to 30th October 2011. During study period the total number of deliveries was 1149, in sixty seven (5.83%) patients vacuum assisted delivery was conducted. Amongst these, sixty five (97.01%) were successful vacuum deliveries while in two patients (2.9%) there was a failure of vacuum application. The mother's age group ranged from 18-40 years with the mean of 27.7 +/- 6.26 years. Among them, twenty four (35.8%) women were primigravida whereas forty three (64.17%) were multigravida. Gestational age varied from 37-43 weeks with the mean of 39.7 +/- 1.17 weeks. Major indication for vacuum application was fetal distress, which was seen in thirty (44.7%) patients. The other prominent indication was prolonged second stage of labour, observed in 17 women (25.37%); mainly due to poor maternal effort in 11 (16.4%) and deep transverse

arrest in 5 (7.4%) patients. Vacuum assisted delivery was conducted in two patients with cord prolapse (2.98%), persistent occipito-posterior in one (1.49%) and one patient was eclamptic (1.49%). Average neonatal weight was 3.11+/-0.38kg. Neonatal complications observed were cephal hematoma in 7 babies (10.44 %), jaundice in 5 (7.4%), birth asphyxia in 2 (2.98%) whereas skull fracture in one (1.49%) newborn. Maternal complications seen were 4th degree perineal tear in 1 (1.49%) woman and extension of episiotomy in 3 (4.4%) patient. Conclusion: Vacuum delivery has a high success rate in suitable cases with acceptably low rate of neonatal and maternal complication.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Mode of delivery in nulliparous women and neonatal intracranial injury

**Citation:** Obstetrics and Gynecology, December 2011, vol./is. 118/6(1239-1246), 0029-7844 (December 2011)

**Author(s):** Werner E.F., Janevic T.M., Illuzzi J., Funai E.F., Savitz D.A., Lipkind H.S.

**Language:** English

**Abstract:** Objective: To compare neonatal neurologic complication rates of cesarean deliveries, forceps-assisted vaginal deliveries, and vacuum-assisted vaginal deliveries. Methods: Data on singleton live births at 34 weeks or greater gestation born to nulliparous women from 1995 to 2003 in New York City were linked to hospital discharge data. Any diagnosis of neonatal subdural hemorrhage, intraventricular hemorrhage, seizures, scalp laceration or cephalohematoma, fracture, facial nerve palsy, brachial plexus injury, or 5-minute Apgar score of less than 7 was considered significant. Multivariable logistic regression was used to estimate associations between delivery mode and these neonatal morbidities. Results: Forceps-assisted vaginal deliveries were associated with significantly fewer seizures and 5-minute Apgar scores less than 7 compared with vacuum-assisted vaginal deliveries and cesarean deliveries. Cesarean deliveries were linked to less subdural hemorrhages compared with forceps-assisted vaginal deliveries or vacuum-assisted vaginal deliveries. When seizure, intraventricular hemorrhage, and subdural hemorrhage were examined collectively to best predict neurologic outcome, forceps-assisted vaginal deliveries had an overall reduced risk compared with both vacuum-assisted vaginal deliveries (odds ratio [OR] 0.60, 95% confidence interval [CI] 0.40-0.90) and cesarean deliveries (OR 0.68, 95% CI 0.48-0.97). The number needed to treat to prevent one case of severe neurologic morbidity is 509 for forceps-assisted vaginal deliveries compared with vacuum-assisted vaginal deliveries and 559 for forceps-assisted vaginal deliveries compared with cesarean deliveries. Conclusion: Compared with vacuum-assisted vaginal delivery or cesarean delivery, a forceps-assisted vaginal delivery is associated with a reduced risk of adverse neonatal neurologic outcomes. © 2011 by The American College of Obstetricians and Gynecologists. Published by Lippincott Williams & Wilkins.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

Available from *Ovid* in [Obstetrics and gynecology.](#)

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**Title:** Head Trauma After Instrumental Births

**Citation:** Clinics in Perinatology, March 2008, vol./is. 35/1(69-83), 0095-5108 (March 2008)

**Author(s):** Doumouchtsis S.K., Arulkumaran S.

**Language:** English

**Abstract:** Instrumental vaginal delivery involves the use of the vacuum extractor or obstetric forceps to facilitate delivery of the fetus. It is associated with substantial risk of head injury, including hemorrhage, fractures, and, rarely, brain damage or fetal death. This review article describes the different types, etiology, pathophysiology, risk factors, and clinical features of head trauma after instrumental birth, along with their management and prevention strategies. © 2008 Elsevier Inc. All rights reserved.

**Publication Type:** Journal: Review

**Source:** EMBASE

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**Title:** Pathological consequences of vacuum assisted birth

**Citation:** Journal of Investigative Medicine, February 2010, vol./is. 58/2(419-420), 1081-5589 (February 2010)

**Author(s):** Schady D.A., Shanklin D.R.

**Language:** English

**Abstract:** Purpose of Study: Normal labor compresses the fetal head in both cephalic and breech presentations. Low segment placental implantation is compressed by the presenting part. Vacuum assisted delivery (VAD) of the fetal head reverses the force vectors of labor, pulling the head rather than pushing from behind; placement of the vacuum assist device may traumatize the edge or chorionic surface of the placenta. Methods Used: We report three cases with adverse consequences, two with direct injuries to head and brain, and one indirect through traumatic laceration of fetal vessels on the placental surface, creating massive air embolism to the fetus. Summary of Results: A male infant, BW 3370 g, 41 weeks, had severe direct traumatic injuries after four unsuccessful attempts at VAD, dying 136.5 hours after the ultimate spontaneous vaginal delivery. There was marked angulation of the

medulla at the upper cervical spinal cord, herniation of the cerebellar tonsils into the foramen magnum, and sagittal oriented precystic necrosis and focal hemorrhage plus other intracranial effects. The second case was a 16 day old male infant, BW 3200 g, by vaginal delivery after three attempts of VAD. The infant collapsed suddenly at home; there was no evidence of overlay or suffocation. Subclinical incomplete fracture lines were found in the posterior skull, subtended by small old subdural hemorrhages. The thickened dura contained 2+ hemosiderosis. Attempted resuscitation included tibial intraosseous infusions with fat embolization to lung; the attempt elicited brief response but no sustained cardiopulmonary action. The third infant was delivered by section in the 38th week after induction by Cytotec(R) and four failed attempts by VAD. The fourth attempt resulted in abundant bleeding in part explained by a long laceration in the lower uterine segment. The male infant weighing 3500 g sustained a skull fracture and survived but with massive left hemispheric infarction in the downstream field of the left middle cerebral artery. Vector force analysis demonstrated the particular result in the first case and traumatic laceration of placental vessels and intraplacental air emboli made likely air embolism as the principal cause of the intracranial lesion in the third case. Conclusions: Vacuum assisted delivery may cause significant trauma to the fetal head or the placenta, with clinical significance.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Ovid* in [Journal of Investigative Medicine](#)

Available from *Ovid* in [Journal of Investigative Medicine](#)

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**Title:** Fetal trauma in term pregnancy

**Citation:** American Journal of Obstetrics and Gynecology, November 2007, vol./is. 197/5(499.e1-499.e7), 0002-9378 (November 2007)

**Author(s):** Baskett T.F., Allen V.M., O'Connell C.M., Allen A.C.

**Language:** English

**Abstract:** Objective: The objective of the study was to determine the incidence and type of fetal trauma in term pregnancy in relation to method of delivery, maternal age, parity, and birthweight. Study Design: From the Nova Scotia Atlee Perinatal Database, fetal trauma was evaluated in all term (37 weeks or longer) singleton fetuses without major anomaly in vertex presentation over a 14-year period (1988-2001). Results: The overall risk of fetal trauma was low (2.0%); that of major fetal trauma was 0.16%. Major and minor fetal trauma was significantly increased with labor, compared with no labor (adjusted relative risks [RRs], 9.59; 95% confidence interval [CI], 1.34-68.47, and RR, 11.25; 95% CI, 5.05-25.09, respectively). Cesarean delivery was protective for major and minor fetal trauma, compared with vaginal delivery (adjusted RRs, 0.21; 95% CI, 0.12-0.40, and RR, 0.46; 95% CI, 0.39-0.54, respectively). Conclusion: The risk of significant fetal trauma in term pregnancy is very low



and most likely to be associated with labor and with assisted vaginal delivery. &#xa9; 2007 Mosby, Inc. All rights reserved.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Neonatal complications of vacuum-assisted delivery.

**Citation:** *Obstetrics and gynecology*, Mar 2007, vol. 109, no. 3, p. 626-633, 0029-7844 (March 2007)

**Author(s):** Simonson, Colin, Barlow, Patricia, Dehennin, Nathalie, Sphel, Marianne, Toppet, Véronique, Murillo, Daniel, Rozenberg, Serge

**Abstract:** To assess systematically the extent of neonatal complications in a cohort of vacuum-assisted deliveries, identify risk factors associated with the occurrence of these complications, and to evaluate the usefulness of skull X-ray and transfontanellar ultrasonography after vacuum extraction. We reviewed a cohort of 1,123 attempted vacuum extractions of singletons performed between January 2000 and December 2004. During this period, a systematic screening using transfontanellar ultrasonography and skull X-ray was performed after vacuum extraction. Among 913 successful vacuum-assisted, full-term deliveries, 25.7% were admitted to the neonatal intensive care unit. Scalp edema, cephalhematoma, and skull fracture were assessed by cranial radiography and were present in, respectively, 18.7%, 10.8%, and 5.0% of cases. Intracranial hemorrhage occurred in eight cases (0.87%). Nulliparity, a vacuum attempt at mid station, an extraction requiring more than three tractions, and dislodgment of the cup were associated with these complications but had a low predictive value. Severe neonatal complications associated with vacuum extraction are uncommon. Systematic X-ray and ultrasonographic examination led to the discovery of asymptomatic complications. Because the clinical significance of these complications is unknown, we do not recommend them as routine screening tools. II.

**Source:** Medline

**Full Text:**

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

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**Title:** Leptomeningeal cyst due to vacuum extraction delivery in a twin infant.

**Citation:** *Acta neurochirurgica*, Mar 2007, vol. 149, no. 3, p. 319, 0942-0940 (March 2007)

**Author(s):** Bobinski, L, Boström, S, Zsigmond, P, Theodorsson, A

**Abstract:** A rare case of a leptomeningeal cyst is reported in a twin male neonate delivered using a vacuum extractor, who presented a huge, non-pulsating, oedematous mass overlying the frontal fontanelle after birth. The mass was initially diagnosed as a cephalo haematoma. Ultrasonography indicated intracranial bleeding and a subsequent CT scan revealed an intraparenchymal bleeding above the left frontal horn, combined with a thin, left-sided, subdural haematoma and subarachnoid haemorrhage in the left Sylvian fissure. Apart from a bulging soft and round formation (2 x 2 x 3 cm) next to the anterior fontanel growing since birth, the neurological development of the infant was normal. MRI examination at the age of 7 months revealed that it consisted of a cystic mass (leptomeningeal cyst) connected to the left frontal horn, stretching right through the brain and also penetrating the dura mater. No signs of the perinatal haematomas were observed at this time. Surgical treatment, with fenestration of the cyst into the frontal horn and a watertight duraplasty with a periosteal flap and thrombin glue covered by small bone chips, was performed at 9 months of age. Due to a residual skull bone defect a second cranioplasty with autologous skull bone was performed three and half years later. During a follow-up period of 12 years the neurological and psychological development of the boy has been indistinguishable to that of his twin brother, indicating the satisfactory outcome of the treatment.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Acta Neurochirurgica](#)

Available from *ProQuest* in [Acta Neurochirurgica](#)

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**Title:** Life-threatening subgaleal hematoma

**Citation:** Swiss Medical Weekly, May 2014, vol./is. 144/(28S), 1424-7860 (26 May 2014)

**Author(s):** Schobi N., Bohm S., Mack A., Rogdo B.

**Language:** English

**Abstract:** Introduction: Subgaleal hematoma (SGH) in newborns is caused by rupture of the emissary veins due to shearing forces to the scalp during delivery. The reported incidence is 4-6 cases in 1000 live births. Instrumental delivery, primiparity, prolonged second stage of labour and bleeding disorders are considered main risk factors. Ongoing, unrecognized bleeding is associated with hypovolemic shock, hence SGH can be devastating and potentially fatal. Mortality in severe SGH is high with reports up to 25% in case series. Case: We report a term female infant with severe SGH, occipital skull fracture, cerebral contusion and intracerebellar hemorrhage due to a consumption coagulopathy. Pregnancy was uneventful. Because of protracted delivery, vacuum extraction was deemed necessary, but proved difficult with multiple dislocations of the vacuum. The infant required resuscitation with bag-mask ventilation after birth. In obvious hemorrhagic shock one hour after birth, the infant required emergency transfusion with 0 negative blood. Despite initial stabilisation, the condition worsened over the next few hours due to continued bleeding and consumption coagulopathy. Further packed red cells, fresh frozen plasma, platelets and

clotting factors were necessary. At the age of 18 hours the infant developed generalized seizures requiring intubation and anticonvulsive therapy. A cerebral CT showed large intracerebellar and brain stem hemorrhage. The patient was extubated five days later. A hydrocephalus occlusus developed due to compression of the aqueduct, requiring insertion of a Rickham reservoir for regular cerebrospinal fluid taps. The patient was discharged at five weeks of age showing minor neurological impairment. Conclusion: Cases of consumption coagulopathy after large SGH have been described in the literature. This might be seen as a first manifestation of inherited bleeding disorders. Close monitoring of infants after difficult instrumental births is important. Infants with large SGHs require intensive care admission with close monitoring of hematology and coagulation parameters.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Swiss Medical Weekly](#)

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**Title:** [Instrumental extraction in 2002 in the "AURORE" hospital network: incidence and serious neonatal complications].

**Citation:** Gynécologie, obstétrique & fertilité, Nov 2003, vol. 31, no. 11, p. 920-926, 1297-9589 (November 2003)

**Author(s):** Dupuis, O, Silveira, R, Redarce, T, Dittmar, A, Rudigoz, R-C

**Abstract:** The purpose of this study was to evaluate the incidence of forceps and vacuum application and the incidence of its related neonatal complications. This study was performed in a network of 37 maternity hospitals. A postal questionnaire was sent to 156 obstetricians between February and March 2003. Response rate was 78%. In 2002 the operative vaginal delivery rate was 11.2% of all live births. Forceps are the primary instruments (6.3%) whereas vacuum delivery rate was 4.9%. One obstetrician never uses forceps while 38 (31%) never use vacuum. Only 29 (24%) report using both instruments frequently. During 2002 no neonatal death related to an operative vaginal delivery was reported while 145 neonatal complications were (3.2%). Major complications were one depressed skull fracture (1/4589) and 14 extensive caput succedaneum (14/4589). Minor complications were cutaneous lesions (124/4589) and facial palsy (6/4589). Vacuum delivery was associated with a significantly higher extensive caput succedaneum rate ( $P = 0.018$ ) while the only depressed skull fracture observed was related to forceps use. Forceps delivery was associated with a significantly higher cutaneous lesions rate ( $P < 0.001$ ). This study showed that, in 2002, operative vaginal deliveries still represent a significant amount of vaginal deliveries, a majority of obstetricians do not use both instrument and neonatal associated complications are frequent (3.2%) but rarely severe. Therefore, we believe that every method that allows a safe teaching of operative delivery should be promoted.

**Source:** Medline

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**Title:** Skull fracture and contralateral cerebral infarction after ventouse extraction

**Citation:** British Journal of Obstetrics and Gynaecology, 2001, vol./is. 108/12(1298-1299), 0306-5456 (2001)

**Author(s):** Choy C.M.Y., Tam W.H., Ng P.C.

**Language:** English

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *British Journal of Obstetrics and Gynaecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

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**Title:** Comparison of maternal and infant outcomes between vacuum extraction and forceps deliveries.

**Citation:** American journal of epidemiology, Jan 2001, vol. 153, no. 2, p. 103-107, 0002-9262 (January 15, 2001)

**Author(s):** Wen, S W, Liu, S, Kramer, M S, Marcoux, S, Ohlsson, A, Sauvé, R, Liston, R

**Abstract:** The authors conducted a population-based historical cohort study in the Canadian province of Quebec to assess the maternal and infant outcomes associated with vacuum extraction and forceps deliveries. The study database contains information on 305,391 mother-infant dyads (linked by a common institutional code and hospital chart number) for singleton live vaginal births with a nonbreech presentation at the gestational age of 37 or more completed weeks and a birth weight between 2,500 and 4,000 g during fiscal years 1991/1992 to 1995/1996. Of the births, 31,015 were delivered by vacuum extraction, and 18,727 were delivered by forceps. Compared with delivery by forceps, the adjusted risk ratios for third-/fourth-degree perineal laceration, intracranial hemorrhage, subdural or cerebral hemorrhage, intraventricular hemorrhage, subarachnoid hemorrhage, cephalhematoma, and neonatal in-hospital death were 0.48 (95% confidence interval: 0.45, 0.50), 1.28 (95% confidence interval: 0.73, 2.25), 0.97 (95% confidence interval: 0.49, 1.93), 0.99 (95% confidence interval: 0.16, 5.97), 5.44 (confidence interval: 1.26, 23.43), 2.02 (95% confidence interval: 1.89, 2.16), and 0.93 (95% confidence interval: 0.32, 2.70), respectively. The authors conclude that vacuum extraction causes less maternal trauma but may increase the risk of cephalhematoma and certain types of intracranial hemorrhage (e.g., subarachnoid hemorrhage).

**Source:** Medline

**Full Text:**

Available from *Oxford University Press* in [American Journal of Epidemiology](#); Note: ;  
Collection notes: To access please select Login with Athens and search and select NHS  
England as your institution before entering your NHS OpenAthens account details.  
Available from *Highwire Press* in [American Journal of Epidemiology](#)

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**Title:** Impact of FDA advisory on reported vacuum-assisted delivery and morbidity.

**Citation:** The Journal of maternal-fetal medicine, Nov 2000, vol. 9, no. 6, p. 321-326, 1057-0802 (2000 Nov-Dec)

**Author(s):** Ross, M G, Fresquez, M, El-Haddad, M A

**Abstract:** In May 1998 the US Food and Drug Administration (FDA) issued a health advisory reporting neonatal injuries/deaths following vacuum delivery and encouraged voluntary reports of future adverse events. We compared FDA reports of vacuum delivery adverse events prior to and following the advisory. The FDA database (MAUDE) was searched for vacuum deliveries using brand name, manufacturer name, and procedure "string searches." Cases were sorted by report date, source, and manufacturer. Neonatal morbidity was quantified as deaths and life-threatening or nonlife-threatening events. A total of 80 reported adverse cases were identified after duplicate cases were consolidated. Twenty-five were reported to the FDA prior to the 1998 advisory and 55 in the immediate 6-month period following the advisory. There was a 22-fold increase in reported events from five events/year prior to the advisory to an estimated 110 events/year following the advisory. The distribution of reporting sources changed significantly following the advisory with increased "manufacturer" (8-43%) and decreased "voluntary" reports (56-20%). All major brand names were represented. During the 6 months following the FDA advisory there were 10 neonatal deaths, 30 life-threatening events, 12 nonlife-threatening events, and three equipment-related reports. Infant deaths were due to intracranial or subgaleal hematomas. Injuries included skull fracture, scalp abrasions, and cephalohematomas. The FDA advisory was associated with a 22-fold increase in the rate of reported adverse events. This increase in reporting likely represents both enhanced awareness of complications as well as an increase in vacuum-related adverse neonatal sequelae. As vacuum delivery is associated with greater neonatal morbidity/ mortality than was previously recognized, the adage that the vacuum is "designed to come off before infant damage occurs" appears unsubstantiated. It is recommended that manufacturers quantify the suction and traction capabilities of present and new proposed vacuum cup designs.

**Source:** Medline

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**Title:** Head injuries after instrumental vaginal deliveries.

**Citation:** Current opinion in obstetrics & gynecology, Apr 2006, vol. 18, no. 2, p. 129-134, 1473-656X (April 2006)

**Author(s):** Doumouchtsis, Stergios K, Arulkumaran, Sabaratnam

**Abstract:** The types, mechanisms and clinical manifestations of head injuries (extracranial, cranial and intracranial) after instrumental delivery are described along with current evidence of their prevention and management. Asymptomatic subdural hematomas can occur in up to 6.1% of uncomplicated vaginal deliveries. Maternal nulliparity, incorrect placement of vacuum extraction cup and failed vacuum extraction are predisposing factors to subgaleal hemorrhage. Injuries associated with the vacuum devices may be minimized if the recommended limits for a safe traction force are not exceeded. There is no difference in the incidence of scalp trauma between vacuum deliveries by a rigid plastic cup (Omnicut) and the standard, silastic cup. The use of a metal cup may increase the occurrence of head injuries. Protective covers over forceps reduce the rates of neonatal facial abrasions and skin bruises. There is no difference in the incidence of cephalhematoma comparing a sequential operative vaginal delivery and a caesarean section following a failed vacuum delivery. Instrumental vaginal deliveries carry substantial risks. Only practitioners who are adequately trained or are under supervision should undertake instrumental delivery. The mode of intervention needs to be individualized after consideration of the operator's skills and experience and the clinical circumstances.

**Source:** Medline

**Full Text:**

Available from *Ovid* in [Current Opinion in Obstetrics and Gynecology](#)

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**Title:** Rapid evolution of a growing skull fracture after vacuum extraction in case of fetal hydrocephalus

**Citation:** Pediatric Neurosurgery, 1997, vol./is. 26/5(269-274), 1016-2291 (1997)

**Author(s):** Hes R., De Jong T.H.R., Paz y Geuze D.H., Avezaat C.J.J.

**Language:** English

**Abstract:** Vacuum extraction in nonprogressive labor is relatively safe. Only a few major complications have been mentioned. This article describes the rapid development of a growing skull fracture associated with a porencephalic cyst and parenchymal brain damage after a difficult vacuum extraction in a patient with congenital hydrocephalus and a thoracic meningomyelocele. The diagnostic and therapeutic management is discussed.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Craniocerebral birth trauma caused by vacuum extraction: A case of growing skull fracture as a perinatal complication

**Citation:** Child's Nervous System, February 1996, vol./is. 12/2(117-120), 0256-7040 (February 1996)

**Author(s):** Papaefthymiou G., Oberbauer R., Pendl G.

**Language:** English

**Abstract:** A case of growing skull fracture following birth trauma and caused by vacuum extraction is reported in order to emphasize the incidence of this peculiar head injury at the beginning of extrauterine life and to point out its relation to possible neuropsychological disturbances that may appear later in childhood. Delivery by vacuum extraction increases the incidence of perinatal injuries and consequently the incidence of neurological deficits in children. Neurosurgical repair is advocated as the appropriate treatment, with the aim not only of cosmetically correcting the lesion's typical subgaleal protuberance with cranioplasty, but also of performing a water-tight closure of the dura, enabling the cerebral cortex to 'fill in' the intracerebral lesion. The surgical technique and gross pathology of the lesion are described together with radiological findings before and after surgery. Reports by other authors are reviewed in an attempt to identify the conditioning factors and pathological features of this traumatic injury to skull and brain in neonates and infants. The literature on cranial fractures associated with intracerebral lesions at this age shows a significant difference in recovery and outcome from that after similar lesions in older children.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Springer Link Journals* in [Child's Nervous System](#)

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**Title:** Skull fracture caused by vacuum extraction.

**Citation:** Obstetrics and gynecology, Oct 1996, vol. 88, no. 4 Pt 2, p. 671-673, 0029-7844 (October 1996)

**Author(s):** Hickey, K, McKenna, P

**Abstract:** The vacuum extractor is being increasingly advocated as the instrument of first choice for assisted vaginal delivery. It is widely believed that the vacuum cup will dislodge before causing serious fetal trauma. Rotational delivery of a term infant was effected using a vacuum extractor. A 6-cm Malmström metal cup with a paramedian application was in place for 12 minutes. The vacuum pressure developed was 0.8 kg/cm<sup>2</sup>. Four traction efforts with contractions were required to deliver the fetal head. A neonatal skull x-ray the following day showed a comminuted parietal bone fracture at the vacuum cup application site. Management was conservative, and the infant's neurologic behavior remained normal. The vacuum extractor exerts considerable traction force. Fetal skull fracture can result, and its true incidence may be higher than expected, considering that few neonates with normal neurologic behavior undergo skull x-ray.

**Source:** Medline

**Full Text:**

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

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**Title:** Vacuum extraction, bone injury and neonatal subgaleal bleeding.

**Citation:** *European journal of pediatrics*, Jul 1992, vol. 151, no. 7, p. 532-535, 0340-6199 (July 1992)

**Author(s):** Govaert, P, Vanhaesebrouck, P, De Praeter, C, Moens, K, Leroy, J

**Abstract:** In a population of 27 Flemish newborns with subgaleal bleeding encountered within a period of 6 years, we studied the obstetrical, clinical and radiological data. In contrast with controversial findings from the available literature, there is little doubt that difficult, often elective vacuum extraction is the main cause of this neonatal emergency. Disturbances in haemostasis, when documented, were attributed to focal intrahaematoma consumption, except for one boy who presented with haemophilia and neonatal subgaleal bleeding. Conventional X-ray examination continues to be of importance for the documentation of suture diastasis, fissures and fractures. CT scan reveals both the amount of extra-osseous bleeding, the degree of bone displacement and injury as well as the type and extent of associated intracranial damage. Subgaleal haemorrhage rarely hides a growing synchondrosal rupture.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [European Journal of Pediatrics](#)

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**Title:** Fetal cranial injuries related to delivery with the Malmström vacuum extractor.

**Citation:** *Obstetrics and gynecology*, Jun 1979, vol. 53, no. 6, p. 750-757, 0029-7844 (June 1979)

**Author(s):** Plauché, W C

**Abstract:** The literature regarding the propensity of the vacuum extractor to cause fetal cranial injuries is reviewed. Eighteen subaponeurotic hemorrhages occurred in 14,276 vacuum extractions (VE). Scalp abrasion or laceration occurred in 12.6%, cephalohematoma in 6%, and intracranial hemorrhage in 0.35%. Assessments of early and late manifestations of neurologic damage indicate little difference between VE deliveries and spontaneous deliveries. An uncorrected perinatal mortality rate of 25.8 per thousand is tabulated, which reduced to 15 per thousand when corrected for deaths not related to the mode of delivery.



Scalp anatomy and the forces exerted on it with vacuum extraction are examined, and suggestions to minimize scalp injuries are offered.

**Source:** Medline

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**Title:** Two cases of congenital depressed skull fractures

**Citation:** Journal of Obstetrics and Gynaecology Research, October 2015, vol./is. 41/(142), 1341-8076 (October 2015)

**Author(s):** Thangavel D.

**Language:** English

**Abstract:** Introduction: Depressed congenital skull fractures are uncommon with an incidence of about 1 in 10 000 in developed nations. They are more often associated with instrumental delivery however can also rarely arise spontaneously. Their diagnosis can be associated with underlying neurological deficit or even intracranial haemorrhage. Case Description: Two cases of atraumatic congenital depressed skull fractures were identified from Westmead Hospital, Sydney, Australia. The first case is a non-presenting twin at term, which was noted to have an uncomplicated depressed skull fracture after a routine caesarean section. During the caesarean section the presenting twin had an uncomplicated forceps extraction and the second twin had a manual cephalic extraction. Interestingly however it was in the non-instrumented second twin that there was a palpable skull depression. The baby had normal neurological status and there was no underlying haemorrhage on head ultrasound. The baby was investigated for connective tissue disorders however no clear aetiology has been identified. The second case is of an uncomplicated breech vaginal delivery without obstetric manoeuvres of a term neonate. The baby was found to have an depressed skull fracture without associated neurological deficit or intracranial haemorrhage. The baby was vitamin D deficient but otherwise had no identifiable underlying cause. Discussion: Although rare, two cases of spontaneous congenital skull fracture have been identified at Westmead Hospital, Sydney, Australia. The causes of atraumatic congenital depressed skull fractures are often unknown however have rarely been associated with diagnosis of connective tissue disorders and even Menke Disease. Often, if uncomplicated they have an unremarkable course with a good prognosis with conservative management. Rigorous postnatal assessment is vital for the diagnosis of depressed skull fracture as they may be otherwise asymptomatic.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

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**Title:** Non-traumatic depressed skull fracture in a neonate or 'ping pong' fracture

**Citation:** BMJ Case Reports, February 2015, vol./is. 2015/(no pagination), 1757-790X (18 Feb 2015)

**Author(s):** Preston D., Jackson S., Gandhi S.

**Language:** English

**Abstract:** This is a case study describing the finding of a depressed skull fracture in a neonate who was delivered without instrumentation and with no history of trauma. Depressed skull fractures are described as being associated with forceps delivery both vaginally and with caesarean section but are much rarer without instrumentation. This obvious abnormality was very concerning for the parents as it was not picked up on antenatal scans and there was no clear cause. There were both cosmetic and neurological concerns and we found no clear consensus on appropriate treatment and prognosis in the literature we had available.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Highwire Press* in [BMJ Case Reports](#)

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**Title:** "Spontaneous" ping-pong fracture in newborns: Case report and review of the literature

**Citation:** *Signa Vitae*, 2015, vol./is. 10/1(103-109), 1334-5605;1845-206X (2015)

**Author(s):** Fantacci C., Massimi L., Capozzi D., Romano V., Ferrara P., Chiaretti A.

**Language:** English

**Abstract:** "Ping-pong" fractures (PPF) are depressed skull fractures typical of newborns. PPF usually result from head injury and, rarely, may cause severe long-term neurological sequelae. The management of PPF is still controversial. The goal of this paper is to present a case of "spontaneous" ping-pong fracture and to review the pertinent literature of the last 20 years. We report on a newborn who presented with a "spontaneous" parietal depressed skull fracture at birth. Preoperative computed tomography (CT) scan confirmed the PPF and excluded brain injuries. Neurosurgical intervention was performed on day 3 with immediate lifting of the fracture; the postoperative course was uneventful. During the last 20 years, 22 cases of "spontaneous ping-pong" fractures in newborn have been reported, with different clinical pictures and management but, generally, with a good outcome. "Ping-pong" fractures can occur in uneventful pregnancies and after uncomplicated vaginal or cesarean deliveries. CT scan, with low-dose protocol for infants, is the gold standard examination to evaluate the fracture and any associated brain lesions. Treatment is selected according to fracture characteristics.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Signa Vitae](#)

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**Title:** Ping pong fracture in the newborn: illustration of a case.

**Citation:** Acta neurologica Belgica, Mar 2014, vol. 114, no. 1, p. 69-70, 2240-2993 (March 2014)

**Author(s):** Cizmeci, Mehmet Nevzat, Kanburoglu, Mehmet Kenan, Cemil, Berker, Gokce, Emre Cemal, Tatli, Mustafa Mansur

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Acta Neurologica Belgica](#)

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**Title:** 'Ping pong' fracture in a term infant

**Citation:** BMJ Case Reports, 2012(no pagination), 1757-790X (2012)

**Author(s):** Brittain C., Muthukumar P., Job S., Sanka S.

**Language:** English

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Highwire Press* in [BMJ Case Reports](#)

Available from *National Library of Medicine* in [BMJ Case Reports](#)

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**Title:** Depressed skull fracture in a newborn baby.

**Citation:** Archives of disease in childhood. Fetal and neonatal edition, Mar 2009, vol. 94, no. 2, p. F137., 1468-2052 (March 2009)

**Author(s):** Dharmaraj, S T, Embleton, N D, Jenkins, A, Jones, G

**Source:** Medline

**Full Text:**

Available from *Highwire Press* in [Fetal and Neonatal](#)

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**Title:** Spontaneous intrauterine ping-pong fracture: Review and case illustration

**Citation:** *Neuropediatrics*, 2009, vol./is. 40/2(73-75), 0174-304X (2009)

**Author(s):** Aliabadi H., Miller J., Radnakrishnan S., Mehta A.I., Thomas K., Selznick L., Goldberg R., Grant G., Fuchs H.

**Language:** English

**Abstract:** We report a case of a closed outer-table parietal ping-pong skull fracture occurring in a 4190-gram female infant born at 39 weeks and 5 days gestation after an uneventful Cesarean section (Apgar scores of 9 and 9 at one and five minutes). There was no maternal history of abdominal trauma during pregnancy and there were no complications or difficulties with Cesarean section delivery. Neurological examination was normal. Computed tomography with three-dimensional reconstruction images showed a 4.5 cm depression in the right parietal bone with a medial lucency consistent with a fracture of the superior margin of the skull and leftward deviation of the sagittal suture and sinus. Spontaneous resolution did not occur by one month of age and the skull fracture was repaired with excellent cosmetic results. Rarely has a case of spontaneous intrauterine skull fracture been reported in an atraumatic Cesarean delivery. We believe this fracture resulted from a chronic in utero process without associated trauma as evidenced by deviation of the sagittal suture and sinus. © Georg Thieme Verlag KG Stuttgart New York.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** A linear fracture and meningitis associated with non-infected cephalohematoma in a neonate.

**Citation:** *Neuropediatrics*, Dec 2010, vol. 41, no. 6, p. 276-278, 1439-1899 (December 2010)

**Author(s):** Karagol, B S, Zenciroglu, A, Kundak, A A, Okumus, N, Aydin, M, Uner, C

**Abstract:** We present a neonate with cephalohematoma complicated by a linear skull fracture and *Staphylococcus epidermidis* meningitis. Clinicians, especially neonatologists, should be aware that a cephalohematoma in the newborn infant with a history of vacuum-assisted delivery could be the origin or trigger point of the infection either as sepsis, meningitis or osteomyelitis. The utmost importance of screening studies should be emphasized in order to be aware of the pathogenic potential of cephalohematomas. © Georg Thieme Verlag KG Stuttgart · New York.

**Source:** Medline

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**Title:** Spontaneous intrauterine linear skull fracture: a rare complication of spontaneous vaginal delivery.

**Citation:** *Obstetrics and gynecology*, May 1996, vol. 87, no. 5 Pt 2, p. 851-854, 0029-7844 (May 1996)

**Author(s):** Heise, R H, Srivatsa, P J, Karsell, P R

**Abstract:** Fetal skull fracture has been reported in conjunction with difficult delivery or extrinsic trauma. We report a case of linear, undisplaced, nondepressed skull fracture occurring in a 3540-g male infant born at 37 weeks and 4 days' gestation. Linear skull fracture occurred despite an uncomplicated spontaneous vaginal delivery in the absence of extrinsic trauma or cephalopelvic disproportion. Subsequent clinical follow-up 6 years later revealed normal neurological development without evidence of epileptiform activity or focal neurologic deficit. Linear skull fracture in association with uncomplicated, spontaneous vaginal delivery is distinctly rare, in contrast to focal, congenital molding depressions of the skull. This case demonstrates that normal spontaneous vaginal delivery without instrumentation or obvious complication can involve sufficient trauma to result in a linear skull fracture. The precise etiology of these fractures requires further study.

**Source:** Medline

**Full Text:**

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

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**Title:** Intrauterine depressed skull fracture with spontaneous resolution

**Citation:** *La Pediatria medica e chirurgica : Medical and surgical pediatrics*, January 2007, vol./is. 29/1(47-49), 0391-5387 (2007 Jan-Feb)

**Author(s):** Rugolotto S., Grippaldi E., Sidoti G., Padovani E.M.

**Language:** English

**Abstract:** We describe a full term male infant born by cesarean section, who presented a deep round depression of the left parietal bone at birth. MRI scan showed no signal alteration on cortical and sub-cortical level in correspondence of the depressed skull fracture. At four months of age, a skull X-ray was normal. At 18 months of age growth and neurologic follow-up is normal.

**Publication Type:** Journal: Article

**Source:** EMBASE

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**Title:** Intrauterine depressed skull fracture.

**Citation:** Pediatric neuroscience, Jan 1989, vol. 15, no. 6, p. 317., 0255-7975 (1989)

**Author(s):** Steinbok, P

**Source:** Medline

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**Title:** Congenital depression of the neonatal skull.

**Citation:** European journal of obstetrics, gynecology, and reproductive biology, Aug 1986, vol. 22, no. 4, p. 249-255, 0301-2115 (August 1986)

**Author(s):** Ben-Ari, Y, Merlob, P, Hirsch, M, Reisner, S H

**Abstract:** Congenital depression of the neonatal skull has had an incidence of 0.1% (1/10 000) in our newborn population during the past 8 years. These skull depressions have two pathogenetic types: deformation without fracture and fracture accompanied by depression. The cause of skull depression being the pressure exerted by the digits and fist of the newborn on his skull has not been previously reported. The treatment of choice for selected cases is nonsurgical elevation with an obstetric vacuum extractor. A CT scan should be performed prior to this treatment to rule out intracranial complications such as hemorrhage.

**Source:** Medline

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**Title:** Spontaneous intrauterine depressed skull fractures.

**Citation:** Child's nervous system : ChNS : official journal of the International Society for Pediatric Neurosurgery, Jan 1986, vol. 2, no. 3, p. 153-156, 0256-7040 (1986)

**Author(s):** Abbassioun, K, Amirjamshidi, A, Rahimizadeh, A

**Abstract:** A survey is made of neonatal skull depressions as a result of experience with ten neonates harboring noniatrogenic intrauterine skull fractures. Several mechanisms causing intrauterine skull depression are discussed. Diagnosis was made after delivery in all cases and was confirmed by skull radiography. Various modes of therapy are mentioned and a stepwise guideline is suggested for correction of the depression by applying CT as an adjuvant diagnostic tool.

**Source:** Medline

**Full Text:**

**Title:** Comparison of "instrument-associated" and "spontaneous" obstetric depressed skull fractures in a cohort of 68 neonates.

**Citation:** American journal of obstetrics and gynecology, Jan 2005, vol. 192, no. 1, p. 165-170, 0002-9378 (January 2005)

**Author(s):** Dupuis, Olivier, Silveira, Ruimark, Dupont, Corinne, Mottolese, Carmine, Kahn, Pierre, Dittmar, Andre, Rudigoz, René-Charles

**Abstract:** A depressed skull fracture is an inward buckling of the calvarial bones and is referred to as a "ping-pong" fracture. This study aimed to look at differences between "spontaneous" and "instrument-associated" depressed skull fractures. This retrospective, case-control analysis included every neonate who was admitted with a depressed skull fracture between 1990 and 2000. Cases after a spontaneous vaginal delivery, elective cesarean delivery, or cesarean delivery that was performed during labor without previous instrument use were classified as "spontaneous" (n = 18 cases). Cases after a delivery in which forceps or a vacuum cup had been used either successfully or unsuccessfully were classified as "instrument-associated" (n = 50 cases). Continuous data were analyzed with 2-tailed unpaired t tests; chi 2 analysis was used for nominal data. A probability value of <.05 was considered statistically significant. Fifty depressed skull fractures were associated with an instrument delivery, and 18 depressed skull fractures were classified as "spontaneous." The only obstetric parameter that differed significantly between the 2 groups was the length of the active phase. Among the 68 neonates, 15 neonates underwent prolonged second stage, forceps or manual head rotation, or forceps use during elective cesarean delivery. All "instrument-associated" cases were caused by forceps application or sequential instrument use; depressed skull fractures never occurred after isolated vacuum extraction. Every type of forceps was involved. Intracranial lesions were significantly more frequent in the instrument-associated group (30% vs 0%; P = .02). Two infants sustained persistent severe motor disabilities. Depressed skull fractures occur in the setting of spontaneous and operative deliveries, although the incidence is higher in the latter case. Depressed skull fractures that are associated with instrumental deliveries are significantly more likely to be associated with intracranial lesions. Persistent disabilities are rare.

**Source:** Medline

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**Title:** Intrauterine depressed skull fractures of the newborn.

**Citation:** Neurosurgery, Jun 1982, vol. 10, no. 6 Pt 1, p. 694-697, 0148-396X (June 1982)

**Author(s):** Garza-Mercado, R

**Abstract:** Intrauterine depressed skull fractures are reported only occasionally. In reviewing the literature it seems clear that pressure of the fetal head against the maternal bony structures, mainly the sacral promontory, accounts for most of the so-called "spontaneous"

congenital depressed skull fractures. Rather than true fractures, they are focal congenital moulding depressions. On the other hand, trauma to the mother's abdomen and traumatic delivery are accepted pathological mechanisms for such lesions; most commonly they are ascribed to inexperienced application of the forceps blades or undue force by the obstetrician at the time of birth. In some cases, however, uncomplicated spontaneous vaginal or cesarean section deliveries have surprisingly and unexpectedly yielded infants with depressed skull fractures. Three such cases are reported, and the literature is reviewed.

**Source:** Medline

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**Title:** Depressed skull fracture in the neonate. Report of three cases.

**Citation:** Journal of neurosurgery, Apr 1979, vol. 50, no. 4, p. 512-514, 0022-3085 (April 1979)

**Author(s):** Saunders, B S, Lazowitz, S, McArtor, R D, Marshall, P, Bason, W M

**Abstract:** The authors describe three cases of neonatal depressed skull fracture that were elevated by means of an obstetrical vacuum extractor. In one case, a transparent breast pump shield replaced the metal vacuum extractor cup, permitting direct observation as the depression was elevated. Neonatal depressed skull fractures not associated with neurological signs may be safely elevated without surgery using the obstetrical vacuum extractor.

**Source:** Medline

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**Title:** Depressed skull fracture in the newborn. A report of 3 cases.

**Citation:** South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, Nov 1978, vol. 54, no. 20, p. 830-832, 0256-9574 (November 11, 1978)

**Author(s):** Beyers, N, Moosa, A, Bryce, R L, Kent, A

**Abstract:** Three cases of depressed skull fractures in neonates are reported. Two of the fractures were related to birth trauma, but the third probably occurred antenatally. Treatment differed in all 3 cases. One baby underwent surgical elevation of the fracture, and another vacuum elevation, while the third received no treatment. We stress the fact that non-surgical elevation of depressed skull fracture may be successful and preferable to more drastic surgical procedures.

**Source:** Medline

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**Title:** Neonatal skull depression unassociated with birth trauma



**Citation:** American Journal of Roentgenology, 1984, vol./is. 143/5(1063-1064), 0361-803X (1984)

**Author(s):** Eisenberg D., Kirchner S.G., Perrin E.C.

**Language:** English

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [American Journal of Roentgenology](#)

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**Title:** Instrumental Rotation for Persistent Fetal Occiput Posterior Position: A Way to Decrease Maternal and Neonatal Injury?

**Citation:** PLoS ONE, October 2013, vol./is. 8/10(no pagination), 1932-6203 (18 Oct 2013)

**Author(s):** Vidal F., Simon C., Cristini C., Arnaud C., Parant O.

**Language:** English

**Abstract:** Objective:To evaluate immediate perineal and neonatal morbidity associated with instrumental rotations performed with Thierry's spatulas for the management of persistent posterior occiput (OP) positions.Methods:Retrospective study including all persistent occiput posterior positions with vaginal OP delivery, from August 2006 to September 2007. Occiput anterior deliveries following successful instrumental rotation were included as well. We compared maternal and neonatal immediate outcomes between spontaneous deliveries, rotational and non rotational assisted deliveries, using  $\chi^2$  and Anova tests.Results:157 patients were enrolled, comprising 46 OP spontaneous deliveries, 58 assisted OP deliveries and 53 deliveries after rotational procedure. Instrumental rotation failed in 9 cases. Mean age and parity were significantly higher in the spontaneous delivery group, while labor duration was shorter. There were no significant differences in the rate of severe perineal tears and neonatal adverse outcomes between the 3 groups.Conclusion:Instrumental rotation using Thierry's spatulas was not associated with a reduced risk of maternal and neonatal morbidity for persistent OP deliveries. Further studies are required to define the true interest of such procedure in modern obstetrics. &#xa9; 2013 vidal et al.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *National Library of Medicine* in [PLoS ONE](#)

Available from *ProQuest* in [PLoS One](#)

Available from *National Library of Medicine* in [PLoS ONE](#)

Available from *Allen Press* in [PLoS One](#)

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**Title:** Intraparenchymal hemorrhage in a neonate with cleidocranial dysostosis

**Citation:** *Annals of Neurology*, 2012, vol./is. 72/(S225-S226), 0364-5134 (2012)

**Author(s):** Gardner M.A., Li B.C., Slavotinek A.M., Wu Y.W.

**Language:** English

**Abstract:** Objective: We present a case of intraparenchymal hemorrhage in a neonate with cleidocranial dysostosis, a skeletal dysplasia that leads to delayed skull ossification. The hemorrhage occurred beneath an area with no protective skull, suggesting a probable traumatic mechanism of injury. Methods: The case is described in detail, including neuroimaging, photographs of the classic dysmorphic features, and genetic testing. Results: Following a spontaneous vaginal birth, the patient was hypotonic and encephalopathic with unusually large and boggy fontanelles. He had no palpable bone overlying his bilateral temporal lobes. He had multiple dysmorphic facial features (Figure 1). The patient's father had similar facial features and congenital absence of the right clavicle, suggestive of cleidocranial dysostosis. A head ultrasound at 2 days of age was concerning for hemorrhage. MRI at four days of age confirmed a large right temporal lobe IPH, with extensive subarachnoid hemorrhage overlying both temporal and parietal lobes (Figure 2). A skeletal survey revealed decreased ossification of the calvarium, (Figure Presented) marked dysplasia of the scapulae bilaterally, and diminutive cervical vertebral bodies. A clinical diagnosis of cleidocranial dysostosis was confirmed by genetic testing of the RUNX2 gene, which revealed a novel sequence alteration that is predicted to be disease-causing. Conclusions: Given that there was no palpable bone overlying the location of brain hemorrhage, and no other cause for hemorrhage was identified, we speculate that the temporal lobe hemorrhage in this case was due to birth trauma.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Full Text:**

Available from *John Wiley and Sons* in [Annals of Neurology](#)

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**Title:** Birth-Related Injury to the Head and Cervical Spine in Neonates

**Citation:** *Magnetic Resonance Imaging Clinics of North America*, November 2011, vol./is. 19/4(777-790), 1064-9689;1557-9786 (November 2011)

**Author(s):** Tekes A., Pinto P.S., Huisman T.A.G.M.

**Language:** English

**Abstract:** Birth-related injury is defined as any traumatic or ischemic event sustained during the process of delivery. Perinatally acquired disease processes secondary to birth-related injury can be traumatic or ischemic in nature. In this article, the authors focus on traumatic/mechanical injuries. Other diseases of the perinatal time period, including germinal matrix hemorrhages and hypoxic-ischemic encephalopathy, are beyond the objective of this review. © 2011 Elsevier Inc.

**Publication Type:** Journal: Review

**Source:** EMBASE

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**Title:** Severe birth trauma: A report of two cases

**Citation:** Early Human Development, November 2010, vol./is. 86/(S138), 0378-3782 (November 2010)

**Author(s):** Kahramaner Z., Erdemir A., Kanik A., Turkoglu E., Cosar H., Sutcuoglu S., Ozer E.A.

**Language:** English

**Abstract:** Aim: Injuries to the neonate that result from mechanical forces during the birth process are called as birth trauma. Incidence is estimated to be 2-7 per 1000 live births. Risk factors include cephalopelvic disproportion, prematurity, prolonged or rapid labor, abnormal presentation and fetal macrosomia. Birth trauma can cause death or serious disability. We report here two cases of birth trauma because of striking radiological findings. Case presentation; Case 1: A 37-week-gestation female neonate weighing 3640 g was born from first pregnancy of a 30-year-old healthy mother by spontaneous vaginal delivery. The patient was admitted to the NICU after delivery because of asphyctic birth and respiratory distress. It was reported that vacuum extraction was used during delivery, the patient was born depressed, resuscitated, intubated and placed on PPV. On physical examination, subcutaneous emphysema was common in all head and neck. Direct radiographs showed diffuse subcutaneous emphysema on head and neck and pneumothorax on right chest. Mechanical ventilator support was applied to her and chest tube inserted. Pneumothorax resolved at follow-up, extubated and Erb paralysis regressed. In our clinic, patient is still being monitored. Case 2: A 2380 g female was born to a 30-year-old, gravida 3 para 2 mother at 37-week-gestation by caesarean section. The patient was referred to our hospital for the depressed skull fracture after birth. There was no history of difficult birth and resuscitation. On physical examination, there was a depressed skull fracture at a width of 5x5 cm, and a depth of 2-3 cm. The CT examination showed that calvaria made a convexity towards the parenchyma in the right posterior parietale region but there was no contusion or hemorrhage in the adjacent parenchyma. The patient was operated and was discharged on the postnatal day 9. Conclusion: Birth injuries account for 2% of neonatal deaths.

Although the rate of birth injuries is decreasing due to the technologic advancements that allow to recognize birth trauma risk factors, still the birth trauma can be and lead to legal problems.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

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**Title:** The significance of incomplete skull fracture in the birth injury.

**Citation:** Medical hypotheses, May 2010, vol. 74, no. 5, p. 898-900, 1532-2777 (May 2010)

**Author(s):** Oh, Chang Keun, Yoon, Soo Han

**Abstract:** Vaginal delivery is accomplished by the force of the labor overcoming the resistance forces of birth canal. During this process, the fetal head passes through the birth canal and the skull receives pressure on the lateral aspect, resulting in molding, the convex shaping of the cranium. Also, the infant's skull is compressed by the mother's pelvic bony structures. These forces may lead to skull fractures and brain injuries. The hypothesis by the authors is that many skull fractures of the newborn present as incomplete fractures. The bony skull of the newborn is histologically primary bone tissue and which is incomplete in its ossification process. During birth the pressure forces upon the newborn's skull is gradual in one direction, rather than a sudden impact, and therefore it is thought that the skull fracture would be an incomplete fracture. However, it is very hard to ascertain the presence of incomplete fractures especially in incompletely ossified skulls with plain X-ray studies, and therefore it is possible that the real incidence of skull fractures in the newborn are higher than reported in the current and past literature. It is also probable that the external forces upon the skull that are sufficient to cause skull fractures, would also lead to significant brain injury more frequently than actually observed, and subsequently contribute to development of many brain disease later in children. The authors of this study propose that very close examination should be conducted to find incomplete fracture, and increased efforts should be made to establish the presence of possible accompanied brain injuries in babies with incomplete skull fracture. The definitive diagnosis and treatment, as well as close follow up of patients with brain injury will assist the clinician in determining the causes of neurological diseases especially in those with previously unknown etiologies, which may be due to birth injuries. Assistance may be also afforded in the early treatment and prevention of such conditions.

**Source:** Medline

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**Title:** Birth injury of the cranium and central nervous system.

**Citation:** Brain pathology (Zurich, Switzerland), Oct 2008, vol. 18, no. 4, p. 565-570, 1015-6305 (October 2008)

**Author(s):** Reichard, Ross

**Abstract:** Birth injury of the scalp, skull and central nervous system (CNS) is a well-recognized complication of a difficult delivery. The rate of birth trauma has dropped precipitously and now accounts for less than 2% of neonatal deaths. Despite this dramatic decrease in birth-trauma mortality significant injuries still occur. A variety of risk factors clearly predispose certain infants to birth-related injury. Recent neuroradiology studies indicate that intracranial hemorrhage, even in asymptomatic infants, is not rare. Pathologists' (neuropathologists and forensic pathologists) appreciation of the spectrum of birth injuries and their sequelae is critical in order to be able to distinguish these from inflicted injuries and post-mortem changes.

**Source:** Medline

**Full Text:**

Available from *John Wiley and Sons* in [Brain Pathology](#)

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**Title:** Neonatal subgaleal hematoma: presentation and outcome--radiological findings and factors associated with mortality.

**Citation:** American journal of perinatology, Jan 2006, vol. 23, no. 1, p. 41-48, 0735-1631 (January 2006)

**Author(s):** Kilani, Ramzi A, Wetmore, Julie

**Abstract:** To describe the presentation and outcome of infants who develop subgaleal hematoma (SGH), we compared perinatal factors, clinical and head imaging findings, and outcome in a cohort (N = 34) of all infants admitted to Saint Louis Children's Hospital neonatal intensive care unit with SGH from January 1991 to June 2003. All except three of the infants admitted with SGH had instrumental deliveries (31 of 34; 91.2%): 21 vacuum, eight vacuum followed by forceps, two forceps). There was also a high frequency of occurrence of associated intracranial hemorrhage (17 of 34; 50%: subarachnoid hemorrhage, n = 4; intraventricular hemorrhage, n = 4; intraparenchymal hemorrhage, n = 4; subdural hemorrhage, n = 11), and skull fracture (six of 34; 19.4%; three of six [50%] of them depressed fractures). There was mortality associated with SGH (four of 34, 11.8%); those who died had significant volume loss with anemia, coagulopathy, and shock requiring large volumes of blood and blood products transfusions. The presence of ICH did not correlate with the severity of SGH or mortality, but the severity of SGH correlates with mortality. Minor neurological abnormalities were noted in only four infants at discharge. In conclusion, SGH is an uncommon type of birth trauma, and is associated with delivery or attempted delivery by instrumentation (vacuum and/or forceps). Severe hypovolemia and coagulopathy, but not intracranial hemorrhage, were the most commonly associated clinical problems with mortality. ICH does not correlate with severity of SGH. A brain computed tomography or magnetic resonance imaging should be considered in evaluating a clinically

symptomatic SGH. There is associated mortality in severe cases but short-term outcome in survivors is good.

**Source:** Medline

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**Title:** Birth trauma in the head and neck

**Citation:** Archives of Otolaryngology - Head and Neck Surgery, February 1999, vol./is. 125/2(193-199), 0886-4470 (February 1999)

**Author(s):** Hughes C.A., Harley E.H., Milmo G., Bala R., Martorella A.

**Language:** English

**Abstract:** Objectives: To review the medical records of neonates found to have birth-associated trauma of the head and neck region. To describe the anomalies, physical findings, and possible sequelae of these injuries and to bring attention to the cause of mechanical birth injury as a potential cause of anomalies in the infant. Design: Case-controlled retrospective chart review of a cohort of patients identified with birth-associated trauma to the head and neck from January 1, 1991, to March 1, 1997. Setting: Academic tertiary care medical center. Patients: Medical records from infants born or transferred with the diagnosis of birth trauma were reviewed. Medical records from a control group of 148 uninjured full-term infants born during the same period were reviewed for comparison. Neonatal charts, including labor and delivery records, were analyzed. Main Outcome Measures: Each patient record was reviewed for diagnosis, associated injuries, maternal statistics, gestational age, birth weight and size, Apgar scores, type of delivery, length of labor, complications of labor, and length of hospital stay. Results: One hundred sixty-four infants (incidence, 0.82%; prevalence, 9.5 per 1000 live-births) were identified with 175 birth-associated injuries to the head and neck. The most common finding was cephalhematoma (56.6%). Other findings included scalp and/or facial lacerations (12%) and hematomas (2.3%), facial nerve paresis (8.6%), brachial plexus injuries (5.1%), clavicular (9.1%) and skull fracture (2.9%), nasal septal dislocation (0.6%), and phrenic (1.7%) and laryngeal nerve injuries (0.6%). Risk factors included birth weight ( $P = .001$ ) vaginal delivery ( $P = .001$ ), primiparity ( $P = .02$ ), forceps delivery ( $P = .005$ ), vacuum delivery ( $P = .001$ ), infants categorized as large for gestational age ( $P = .02$ ), and male infant sex ( $P = .03$ ). Apgar scores were also noted to be lower in our study population ( $P = .001$ ). Risk factors for specific types of injuries varied. However, facial nerve paralysis was associated with multiple birth injuries ( $P = .001$ ), and 2 of 3 phrenic nerve injuries co-occurred with brachial plexus injuries. Correlation coefficients for factors such as maternal age, gravidity, and race were low. Conclusion: Birth-associated head and neck trauma is rare. However, mechanical birth-associated trauma must be considered when assessing anomalies, injuries, respiratory difficulty, or feeding difficulties in the neonate or infant. A comprehensive approach is required to diagnose and manage these patients.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:**

Available from *Free Access Content* in [Archives of Otolaryngology - Head and Neck Surgery](#)

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**Title:** Bone injuries during delivery.

**Citation:** Indian journal of pediatrics, Jul 1994, vol. 61, no. 4, p. 401-405, 0019-5456 (1994 Jul-Aug)

**Author(s):** Bhat, B V, Kumar, A, Oumachigui, A

**Abstract:** Bone injuries during the process of delivery were studied among 34, 946 live born babies over a 11 period. There were 35 cases of bone injuries giving an incidence of 1 per 1,000 live births. Clavicle was the commonest bone fractured (45.7%) followed by humerus (20%), femur (14.3%) and depressed skull fracture (11.4%) in the order of frequency. There was one case each of orbital fracture, epiphyseal separation of lower end of femur and dislocation of elbow joint. Lack of antenatal care, malpresentation often leading to obstructed labour and operative deliveries were found to be risk factors for bone injuries. Meconium stained liquor and birth asphyxia were more commonly associated with bone injuries than control cases. Cases with injuries had longer hospital stay and higher mortality. Improving the health infrastructure at the peripheral level with early identification of high risk mothers and their appropriate management can bring down the incidence of bone injuries.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Indian Journal of Pediatrics, The](#)  
Available from *Free Access Content* in [Indian Journal of Pediatrics](#)

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**Title:** Predisposing factors in obstetrical fractures.

**Citation:** Skeletal radiology, Jan 1993, vol. 22, no. 3, p. 195-198, 0364-2348 (1993)

**Author(s):** Nadas, S, Gudinchet, F, Capasso, P, Reinberg, O

**Abstract:** To compare various obstetrical methods with different types of obstetrical fractures, 29 neonates with fractures were evaluated retrospectively. Plain films of skull, limbs and chest were obtained. Transfontanellar ultrasonography was performed in one case and a computed tomographic scan of the skull in two. We reviewed 12 fractures of long bones, 7 fractures of the skull, and 10 fractures of the clavicle. Ten fractures occurred during caesarean sections and 11 in vaginal delivery requiring medical assistance. Depressed skull fractures were associated with manoeuvres and the use of forceps during delivery. Fractures of the long bones were associated with caesarean section, breech delivery with assistance and low birth weight. All fractures were treated conservatively except for skull

fractures with depression of more than 2 cm. Early consolidation occurred in all fractures of long bones. The long-term follow-up of all fractures but one revealed no persisting disability. The belief that obstetrical fractures occur primarily in large babies or after breech delivery is not supported by this study.

**Source:** Medline

**Full Text:**

Available from *Springer Link Journals* in [Skeletal Radiology](#)

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**Title:** Obstetric fractures.

**Citation:** European journal of pediatric surgery : official journal of Austrian Association of Pediatric Surgery ... [et al] = Zeitschrift für Kinderchirurgie, Jun 1992, vol. 2, no. 3, p. 165-168, 0939-7248 (June 1992)

**Author(s):** Nadas, S, Reinberg, O

**Abstract:** The purpose of this study was to determine the risk factors predisposing to an obstetric fracture, and their long-term outcome. We reviewed 28 obstetric fractures treated in the County of Vaud, Switzerland, between 1976 and 1989. There were 12 fractures of long bones, 10 clavicles and 6 depressed skull fractures. The belief that obstetric fractures occur in large babies or after breech deliveries is no longer valid. The common risk factors of these fractures are obstetric maneuvers during delivery (75% of cases), especially Cesarean sections (35%), prolonged labor (33%), and prematurity (25%). Cephalic presentation (64.2% of cases) is more frequent than breech position (32.1%). Weight, size, age of gestation, age of the mother, parity, gestity, and time of delivery cannot be considered as risk factors for obstetric fractures. For each type of fracture some specific risk factors are pointed out: maneuvers at birth for depressed skull fracture, Cesarean section, breech delivery with assistance and low birth weight for the fractures of long bones. All fractures were treated conservatively, except for skull fractures with a depression of more than 2 cm. Early consolidation is achieved within 2 weeks. Long-term prognosis for obstetric fractures is good without sequelae.

**Source:** Medline

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**Title:** Intracranial hemorrhage in the term newborn.

**Citation:** Archives of neurology, Jan 1984, vol. 41, no. 1, p. 30-34, 0003-9942 (January 1984)

**Author(s):** Fenichel, G M, Webster, D L, Wong, W K

**Abstract:** Over a five-year period we identified 22 term newborns with intracranial hemorrhage by computed tomography in an intensive care unit for newborns. Primary subarachnoid hemorrhage (diffuse or focal) was the most common type of hemorrhage.



Diffuse subarachnoid hemorrhage was caused either by traumatic delivery or severe hypoxic-ischemic encephalopathy and caused seizures on the first day. Focal subarachnoid hemorrhage was associated with cerebral infarction. Intraventricular hemorrhage was always accompanied by bloody CSF. Somewhat more than half the newborns with intraventricular hemorrhage had a history of traumatic delivery. In the remainder there were no associated risk factors for the hemorrhage. Hemorrhage into the cerebral hemispheres occurred without any identifiable risk factors. Hemorrhage into the cerebellum was associated with traumatic delivery.

**Source:** Medline

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