



Pain caused by parturition in sows (II): useful indicators and pain relief

Devillers N, Le Dividich J, Prunier A 2011. Influence of colostrum intake on piglet survival and immunity. *Animal* 5: 1605–1612. <https://doi.org/10.1017/S175173111100067X>

Di Giminiani P, Brierley VLMH, Scollo A, Gottardo F, Malcolm EM, Edwards SA, Leach, MC 2016. The Assessment of Facial Expressions in Piglets Undergoing Tail Docking and Castration: Toward the Development of the Piglet Grimace Scale. *Frontiers in Veterinary Science* 3: 100. <https://doi.org/10.3389/fvets.2016.00100>

Homedes J, Salichs M, Sabaté D, Sust M, Fabre R 2014. Effect of ketoprofen on pre-weaning piglet mortality on commercial farms. *Veterinary Journal* 201: 435–437. <http://dx.doi.org/10.1016/j.tvjl.2014.05.038>

Ison SH, Jarvis S, Rutherford KMD 2016. The identification of potential behavioural indicators of pain in periparturient sows. *Research in Veterinary Science* 109: 114–120. <https://doi.org/10.1016/j.rvsc.2016.10.002>

Ison SH, Jarvis S, Ashworth CJ, Rutherford KMD 2017. The effect of post-farrowing ketoprofen on sow feed intake, nursing behaviour and piglet performance. *Livestock Science* 202: 115–123. <http://dx.doi.org/10.1016/j.livsci.2017.06.001>

Ison SH, Jarvis S, Hall SA, Ashworth CJ, Rutherford KMD 2018. Periparturient behavior and physiology: Further insight into the farrowing process for primiparous and multiparous sows. *Frontiers in Veterinary Science* 5: 122. <https://doi.org/10.3389/fvets.2018.00122>

Mainau E, Temple D, Manteca X 2016. Experimental study on the effect of oral meloxicam administration in sows on pre-weaning mortality and growth and immunoglobulin G transfer to piglets. *Preventive Veterinary Medicine* 126: 48–53. <https://doi.org/10.1016/j.prevetmed.2016.01.032>

Mainau E, Manteca X 2011. Pain and discomfort caused by parturition in cows and sows. *Applied Animal Behaviour Science* 135: 241–251. <https://doi.org/10.1016/j.applanim.2011.10.020>

McLennan KM, Rebelo CJB, Corke MJ, Holmes MA, Leach MC, Constantino-Casas F 2016. Development of a facial expression scale using footrot and mastitis as models of pain in sheep. *Applied Animal Behaviour Science* 176: 19–26. <https://doi.org/10.1016/j.applanim.2016.01.007>

McLennan KM 2018. Why Pain Is Still a Welfare Issue for Farm Animals, and How Facial Expression Could Be the Answer. *Agriculture* 8: 127. <https://doi.org/10.3390/agriculture8080127>

Navarro E, Mainau E, Manteca X 2020. Development of a Facial Expression Scale Using Farrowing as a Model of Pain in Sows. *Animals* 10: 2113. <https://doi.org/10.3390/ani10112113>

Navarro E, Mainau E, De Miguel R, Temple D, Salas M, Manteca X 2021. Oral meloxicam administration in sows at farrowing and its effects on piglet immunity transfer and growth. *Frontiers in Veterinary Science* 8: 574250. <https://doi.org/10.3389/fvets.2021.574250>

Salmon H, Berri M, Gerdtts V, Meurens F 2009. Humoral and cellular factors of maternal immunity in swine. *Development & Comparative Immunology* 33: 384–393. <https://doi.org/10.1016/j.dci.2008.07.007>

Tenbergen R, Friendship R, Cassar G, Amezcua MR, Haley D 2014. Investigation of the use of meloxicam post farrowing for improving sow performance and reducing pain. *Journal of Swine Health and Production* 22: 10–15. <http://www.aasv.org/shap.html>

Viitasaari E, Hänninen L, Heinonen M, Raekallio M, Orro T, Peltoniemi O, Valros A 2013. Effects of post-partum administration of ketoprofen on sow health and piglet growth. *Veterinary Journal* 198: 153–157. <http://dx.doi.org/10.1016/j.tvjl.2013.06.013>

Viscardi AV, Hunniford M, Lawlis P, Leach M, Turner PV 2017. Development of a Piglet Grimace Scale to Evaluate Piglet Pain Using Facial Expressions Following Castration and Tail Docking: A Pilot Study. *Frontiers in Veterinary Science* 4: 51. <https://doi.org/10.3389/fvets.2017.00051>