

## CONCLUSION

There is significant positive correlation among the four methods of measuring cervical length during the different gestational ages. High significant correlation was observed in all cases. With respect to strong of correlation. so if we have one measure we can predict the other measures so:

- Trans abdominal assessment could be used initially for cervical length screening, considering the maternal and fetal condition.
- Then, if the need arises, trans vaginal sonography could be used.
- This step-by-step approach may be more convenient and useful to both patients and physicians for cervical length screening.

## **RECOMMENDATION**

- Transabdominal assessment could be used initially for cervical length screening, considering the maternal and fetal condition. Then, if the need arises, transvaginal sonography could be used. This step-by-step approach may be more convenient and useful to both patients and physicians for cervical length screening.
- Future randomized controlled trials are warranted to determine the proper timing for transabdominal cervical length scan for early diagnosis of preterm labor.

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## REFERENCES

1. Rumack CM, Wilson SR, Charboneau W, Levine D. Diagnostic Ultrasound. 4th ed. Philadelphia: Elsevier Mosby; 2011.
2. Taylor BK. Sonographic Assessment of Cervical Length and the Risk of Preterm Birth. *J Obstet Gynecol Neonatal Nurs* 2011; 40 (5): 617–31.
3. Li Z, Zeki R, Hilder L, Sullivan EA. 2012. Australia's mothers and babies 2010. Perinatal Statistics series no. 27. Cat. no. PER 57. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.
4. Tracy SK, Tracy MB, Dean J, Laws P, Sullivan E. Spontaneous preterm birth of liveborn infants in women at low risk in Australia over 10 years: a population-based study. *BJOG* 2007; 114 (6): 731–35.
5. Goldenberg R.L., Davis R.O., Cutter G.R. et al. Prematurity, postdates, and growth retardation: the influence of use of ultrasonography on reported gestational age. *Am. J. Obstet. Gynecol.* 1989; 160: 462–70.
6. Kogan M.D., Alexander G.R., Kotelchuck M., MacDorman M.F., Buekens P. and Papiernik E. A comparison of risk factors for twin preterm birth in the United States between 1981–82 and 1996–97. *Matern. Child Health J.* 2002; 6: 29–35.
7. Joseph K.S., Marcoux S., Ohlsson A. et al. Preterm birth, stillbirth and infant mortality among triplet births in Canada, 1985–96. *Paediatr. Perinatal Epidemiol.* 2002; 16:141–8.
8. Olsen P., Laara E., Rantakallio P. et al. Epidemiology of preterm delivery in two birth cohorts with an interval of 20 years. *Am. J. Epidemiol.* 1995; 142: 1184–93.
9. Geary M. and Lamont R. Prediction of preterm birth. In M. G. Elder, R. F. Lamont and R. Romero, eds., *Preterm Labor*. New York NY: Churchill Livingstone, 1993; pp. 51–63.
10. Hagan R., Benninger H., Chiffings D., Evans S. and French N. Very preterm birth – a regional study. Part 1: Maternal and obstetric factors. *BJOG*. 1996; 103: 230–8.
11. Bennett M. J., Berry J. V. J.: Preterm labour and congenital malformations of the uterus. *Ultrasound in Med. Biol.* 5:83-85, 1979.
12. Powers W. F.: Twin Pregnancy. *Obstet. Gynecol.* 42:795, 1973.
13. Ugwumadu A., Manyonda I., Reid. F. and Hay P. Effect of early oral clindamycin on late miscarriage and preterm delivery in asymptomatic women with abnormal vaginal flora and bacterial vaginosis: a randomised controlled trial. *Lancet* 2003; 361: 983–8.
14. Goldenberg R.L., Klebanoff M.A., Nugent R. et al. Bacterial colonization of the vagina during pregnancy in four ethnic groups. *Vaginal Infections and Prematurity Study Group.* *Am. J. Obstet. Gynecol.* 1996; 174: 1618–21.

15. Macmillan S., McKenzie H., Flett G. and Templeton A. Which women should be tested for *Chlamydia trachomatis*? *BJOG* 2000; 107: 1088–93.
16. Andrews W.W., Hauth J.C. and Goldenberg R.L. Infection and preterm birth *Am. J. Perinatol.* 2000; 17(b): 357–65.
17. Ryan G.M.Jr., Abdella T.N., McNeeley S.G., Baselski V.S. and Drummond D.E. *Chlamydia trachomatis* infection in pregnancy and effect of treatment on outcome. *Am. J. Obstet. Gynecol.* 1990; 162: 34–9.
18. Divers M.J. and Lilford R.J. Infection and preterm labor: a meta-analysis. *Contemp.Rev. Obstet. Gynaecol.* 1993; 5: 71–4.
19. Hillier S.L., Nugent R.P., Eschenbach D.A. et al. Association between bacterial vaginosis and preterm delivery of a low-birth-weight infant. The Vaginal Infections and Prematurity Study Group *N. Engl. J. Med.* 1995; 333: 1737–42.
20. Odendaal H.J., Popov, I., Schoeman, J. and Grove, D. Preterm labour: is *Mycoplasma hominis* involved? *S. Afr. Med. J.* 2002; 92: 235–7.
21. McDonald H.M., O’Loughlin J.A., Jolley P., Vigneswaran R. and McDonald P. J. (1991) Vaginal infection and preterm labour. *BJOG.* 1991; 98: 427–35.
22. Ekwo E.E., Gosselink C.A., Woolson R. and Moawad A. Risks for premature rupture of amniotic membranes. *Intl. J. Epidemiol.* 1993; 22: 495–503.
23. Klebanoff M.A., Carey J.C., Hauth J.C. et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units. Failure of metronidazole to prevent preterm delivery among pregnant women with asymptomatic *Trichomonas vaginalis* infection. *N. Engl. J. Med.* 2001; 345: 487–93.
24. Gulmezoglu A.M. Interventions for trichomoniasis in pregnancy. *Cochrane Database Syst. Rev.* 3, CD000220. (1992) Prenatal microbiological risk factors associated with preterm birth. *BJOG.* 2002; 99: 190–6.
25. McDonald H.M., O’Loughlin J.A., Jolley P., Vigneswaran R. and McDonald P.J. Vaginal infection and preterm labour. *BJOG* 98, 427–35. Prenatal microbiological risk factors associated with preterm birth. *BJOG.* 1992; 99: 190–6.
26. Arechavaleta-Velasco F., Koi H., Strauss J.F. III and Parry S. Viral infection of the trophoblast: time to take a serious look at its role in abnormal implantation and placentation? *J. Reprod. Immunol.* 2002; 55: 113–21.
27. Salafia C.M., Vogel C.A., Vintzileos A.M. et al. Placental pathologic findings in preterm birth. *Am. J. Obstet. Gynecol.* 1991; 165: 934–8.
28. Smaill F. Antibiotics for asymptomatic bacteriuria in pregnancy. *Cochrane Database Syst Rev* 2, 2001; CD000490.
29. Challis J.R.G. and Lye S.J. Parturition. In E. Knobil and J. D. Neil eds., *The physiology of Reproduction.* New York: Raven Press, 1994; pp. 985–1031.

30. Warren W.B., Patrick S.L. and Goland R.S. Elevated maternal plasma corticotrophin releasing hormone levels in pregnancies complicated by preterm labor. *Am. J. Obstet.Gynecol.* 1992; 166: 119.
31. Ghidini A, Jenkins C.B., Spong C.Y. et al. Elevated amniotic fluid interleukin-6 levels during the early second trimester are associated with greater risk of subsequent preterm delivery. *Am. J. Reprod. Immunol.* 1997; 37: 227–31.
32. Wenstrom K.D., Andrews W.W., Hauth J.C. et al. Elevated second-trimester amniotic fluid interleukin-6 levels predict preterm delivery. *Am. J. Obstet. Gynecol.* 1998; 178: 546–50.
33. Goepfert A.R., Goldenberg R.L., Andrews W.W. et al; National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. The Preterm Prediction Study: Association between cervical interleukin 6 concentration and spontaneous preterm birth. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. *Am. J. Obstet. Gynecol.* 2001; 184: 483–8.
34. Pennell CE, Jacobsson B, Williams SM, Buus RM, Muglia LJ, Dolan SM, et al., et al. Genetic epidemiologic studies of preterm birth: guidelines for research. *Am J Obstet Gynecol* 2007; 196: 107-18 doi: 10.1016/j.ajog.2006.03.109 pmid:17306646.
35. Vadillo-Ortega F., Hernandez A., Gonzales-Avila G. et al. Increased matrix metalloproteinase activity and reduced tissue inhibitor of metalloproteinases-1 levels in amniotic fluids from pregnancies complicated by premature rupture of membranes. *Am. J. Obstet.Gynecol.* 1996; 174: 1371–6.
36. Macnaughton M.C., Chalmers I.G., Dubowitz V. et al. Final report of the Medical Research Council/Royal College of Obstetricians and Gynaecologists Multicentre Randomised Trial of Cervical Cerclage *BJOG.* 1993; 100: 516–23.
37. Hoffman H.J. and Bakketeig L.S. Epidemiology of preterm birth: results from a longitudinal study of births in Norway. In M. G. Elder and C. H. Hendricks, eds., *Preterm Labour.* London: Butterworths, 1981; pp. 93–115.
38. Carr-Hill R.A. and Hall M.H. The repetition of spontaneous preterm labour. *BJOG.* 1985; 92: 921–8.
39. Hoffman H.J. and Bakketeig L.S. Risk factors associated with the occurrence of preterm birth. *Clin. Obstet. Gynecol.* 1984; 27: 539–52.
40. Lao T.T. and Ho L.F. Induced abortion is not a cause of subsequent preterm delivery in teenage pregnancies. *Hum. Reprod.* 1998;13: 758–61.
41. Basso O., Olsen J. and Christensen K. Risk of preterm delivery, low birthweight and growth retardation following spontaneous abortion: a registry-based study in Denmark *Int.J. Epidemiol.* 1998; 27: 642–6.
42. Zhou W., Sorensen H.T. and Olsen J. Induced abortion and subsequent pregnancy duration. *Obstet. Gynecol.* 1999; 4: 948–53.

43. Henriet L. and Kaminski M. Impact of induced abortions on subsequent pregnancy outcome: the 1995 French national perinatal survey. *BJOG*.2001; 108: 1036–42.
44. Khoshnood B., Lee K.S., Wall S., Hsieh H.L. and Mittendorf R. Short interpregnancy intervals and the risk of adverse birth outcomes among five racial /ethnic groups in the United States. *Am. J. Epidemiol.* 1998; 148: 798–805.
45. Klerman L.V., Cliver S.P. and Goldenberg R.L. The impact of short interpregnancy intervals on pregnancy outcomes in a low-income population. *Am. J. Public Health.* 1998; 88:1182–5.
46. Smith G.C.S., Pell J.P. and Dobbie R. Interpregnancy interval and risk of preterm birth and neonatal death: retrospective cohort study. *BMJ.* 2003; 327: 313–19.
47. Tough S.C., Newburn-Cook C., Johnston D.W. et al. Delayed childbearing and its impact on population rate changes in lower birth weight, multiple birth, and preterm delivery. *Pediatrics.* 2002; 109: 399–403.
48. Hall M. H. Incidence and distribution of preterm labour. In R. W. Beard and F. Sharp eds., *Preterm Labour and Its Consequences*. London: RCOG, 1985; pp. 5–13.
49. Kumari A.S. and Badrinath P. Extreme grandmultiparity: is it an obstetric risk factor? *Eur. J. Obstet. Gynecol. Reprod. Biol.* 2002; 101: 22–5.
50. Gardner M.O., Goldenberg R.L., Cliver S.P. et al. The origin and outcome of preterm twin pregnancies. *Obstet. Gynecol.* 1995; 85: 553–7.
51. Wright S.P., Mitchell E.A., Thompson J.M. et al. Risk factors for preterm birth: a New Zealand study. *N. Z. Med. J.* 1998; 111: 14–16.
52. Kogan M.D., Alexander G.R., Kotelchuck M. et al. Trends in twin birth outcomes and prenatal care utilization in the United States, 1981–1997. *JAMA.* 2000; 284: 335–41.
53. Joseph K.S., Marcoux S., Ohlsson A. et al. Preterm birth, stillbirth and infant mortality among triplet births in Canada, 1985–96. *Paediatr. Perinatal Epidemiol.* 2002; 16:141–8.
54. Levene M.I., Wild J. and Steer P.J. Higher multiple births and the modern management of infertility in Britain. *BJOG*.1992; 99: 607–13.
55. Pandian Z., Bhattacharya S. and Templeton A. Review of unexplained infertility and obstetric o
56. Wenstrom K.D., Syrop C.H., Hammett E.G. and Van Voorhis B.J. Increased risk of monozygotic twinning associated with assisted reproduction. *Fertil. Steril.* 1993; 60: 510–514.
57. Zeitlin J.A., Saurel-Cubizolles M.J. and Ancel P.Y. EUROPOP Group. Marital status,cohabitation, and risk of preterm birth in Europe: where births outside marriage are common and uncommon. *Pediatr. Perinatal Epidemiol*, 2002; 16: 124–30.

58. Johnson D., Jin Y. and Truman C. Influence of aboriginal and socioeconomic status on birth outcome and maternal morbidity. *J. Obstet. Gynaecol. Can.* 2002; 24: 633–40.
59. Teitelman A.M., Welch L.S., Hellenbrand K.G. and Bracken M.B. Effect of maternal work activity on preterm birth and low birth weight. *Am. J. Epidemiol.* 1990; 131:104–13.
60. Mozurkewich E.L., Luke B., Avni M. and Wolf F.M. Working conditions and adverse pregnancy outcome: a meta-analysis. *Obstet. Gynecol.* 2000; 95: 623–35.
61. Kramer M.S., McLean F.H., Eason E.L. and Usher R.H. Maternal nutrition and spontaneous preterm birth. *Am. J. Epidemiol.* 1992; 136: 574–83.
62. Siega-Riz A.M., Adair L.S. and Hobel C.J. Maternal underweight status and inadequate rate of weight gain during the third trimester of pregnancy increases the risk of preterm delivery. *J. Nutrit.* 1996; 126: 146–53
63. Carmichael S. Abrams B. and Selvin S. The association of pattern of maternal weight gain with length of gestation and risk of spontaneous preterm delivery. *Pediat. Perinatal Epidemiol.* 1997; 11: 392–406.
64. Cohen G.R., Curet L.B., Levine R.J. et al. Ethnicity, nutrition, and birth outcomes in nulliparous women. *Am. J. Obstet. Gynecol.* 2001; 185: 660–7.
65. Kesmodel U., Olsen S.F. and Secher N.J. Does alcohol increase the risk of preterm delivery? *Epidemiology.* 2000; 11: 512–18.
66. Peacock J.L., Bland J.M. and Anderson H.R. Preterm delivery: effects of socioeconomic factors, psychological stress, smoking, alcohol, and caffeine. *BMJ.* 1995; 311: 531–5.
67. Kyrklund-Blomberg N.B. and Cnattingius S. Preterm birth and maternal smoking: risks related to gestational age and onset of delivery. *Am. J. Obstet. Gynecol.* 1998; 179: 1051–5.
68. Calhoun B.C. and Watson P.T. The cost of maternal cocaine abuse: I. Perinatal cost. *Obstet. Gynecol.* 1991; 78: 731–4.
69. Williams M.A., Mittendorf R., Stubblefield P.G. et al. Cigarettes, coffee, and preterm premature rupture of the membranes. *Am. J. Epidemiol.* 1992; 135: 895–903.
70. Eskenazi B., Stapleton A.L., Kharrazi M. and Chee W.Y. Associations between maternal decaffeinated and caffeinated coffee consumption and fetal growth and gestational duration. *Epidemiol.* 1999; 10: 242–9.
71. Fortier I., Marcoux S. and Beaulac-Baillargeon L. Relation of caffeine intake during pregnancy to intrauterine growth retardation and preterm birth. *Am. J. Epidemiol.* 1993; 137:931–40.

72. Santos I.S., Victora C.G., Huttly S. and Carvalhal J.B. Caffeine intake and low birth weight: a population-based case-control study. *Am. J. Epidemiol.* 1998; 147: 620–7.
73. Hall M.H. and Carr-Hill R.A. The significance of uncertain gestation for obstetric outcome. *BJOG.* 1985; 92: 452–60.
74. Astolfi P. and Zonta L.A. Risks of preterm delivery and association with maternal age, birth order and fetal gender. *Hum. Reprod.* 1999; 14: 2891–4.
75. Vintzileos A.M., Ananth C.V., Smulian J.C., Scorza W.E. and Knuppel R.A. The impact of prenatal care in the United States on preterm births in the presence and absence of antenatal high-risk conditions. *Am. J. Obstet. Gynecol.* 2002; 187: 1254–7.
76. Wildschut H.I., Nas T. and Golding J. Are sociodemographic factors predictive of preterm birth? A reappraisal of the 1958 British Perinatal Mortality Survey. *BJOG* 1997; 104:57–63.
77. Fan Y.D., Pastorek J.G., Miller J.M. and Mulvey J. Acute pyelonephritis in pregnancy. *Am. J. Perinatol.* 1987; 4: 324–6.
78. Madinger N.E., Greenspoon J.S. and Ellrodt A.G. Pneumonia during pregnancy: has modern technology improved maternal and fetal outcome? *Am. J. Obstet. Gynecol.* 1989; 161:657–62.
79. Anderson B. and Nielsen T.F. Appendicitis in pregnancy: diagnosis, management and complications. *Acta Obstet. Gynecol. Scand.* 1999; 78: 758–62.
80. How H.Y., Hughes S.A., Vogel R.L., Gall S.A. and Spinnato J.A. Oral terbutaline in the outpatient management of preterm labor. *Am. J. Obstet. Gynecol.* 1995; 173: 1518–22.
81. Creasy R.K., Gummer B.A. and Liggins G.C. System for predicting spontaneous preterm birth. *Obstet. Gynecol.* 1980; 55: 692–5.
82. Mercer B.M., Goldenberg R.L., Das A. et al. The preterm prediction study: A clinical risk assessment system. *Am. J. Obstet. Gynecol.* 1996; 174: 1885–95.
83. Lockwood C.J., Seneyi A.E., Dische R. et al. Fetal fibronectin in cervical and vaginal secretions as a predictor of preterm delivery. *N. Engl. J. Med.* 1991; 325: 669–74.
84. McKenna D.S., Chung K. and Iams J.D. Effect of digital cervical examination on the expression of fetal fibronectin. *J. Reprod. Med.* 1999. 44: 796–800.
85. Gibson J.L., Macara L., Owen P., et al. Prediction of preterm delivery in twin pregnancy: a prospective, observational study of cervical length and fetal fibronectin testing. *Ultrasound Obstet. Gynecol.* 2004; 23: 561–6.
86. Honest H., Bachmann L.M., Gupta J.K., Kleijnen J. and Khan K.S. Accuracy of cervicovaginal fetal fibronectin test in predicting risk of spontaneous preterm birth: systematic review. *BMJ.* 2002; 325: 301–4.



87. Joffe G.M., Jacques D., Bemis-Heyes R. et al. Impact of the fetal fibronectin assay on admissions for preterm labor. *Am. J. Obstet. Gynecol.* 1999; 180: 581–6.
88. Newman R.B., Campbell B.A. and Stramm S.L. Objective tocodynamometry identifies labor onset earlier than subjective maternal perception. *Obstet. Gynecol.* 1990; 76: 1089–92.
89. Keirse M.J.N.C. An evaluation of formal risk scoring for preterm birth. *Am. J. Perinatol.* 1989; 6: 226–33.
90. United States Preventive Services Task Force Home uterine activity monitoring for preterm labor Policy Statement. *JAMA.* 1993; 270: 369–70.
91. Iams J.D., Newman R.B., Thom E.A. et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units Frequency of uterine contractions and the risk of spontaneous preterm delivery. *N. Engl. J. Med.* 2002; 346: 250–5
92. Iams J.D., Goldenberg R.L., Meis P.J. et al. The length of the cervix and the risk of spontaneous preterm delivery. *N. Engl. J. Med.* 1996; 334: 567–72.
93. Berghella V., Tolosa J. E., Kuhlman K. et al. Cervical ultrasonography compared with manual examination as a predictor of preterm delivery. *Am. J. Obstet. Gynecol.* 1997; 177: 723–30.
94. Andersen H.F. Transvaginal and transabdominal ultrasonography of the uterine cervix during pregnancy. *J. Clin. Ultrasound.* 1991; 19: 77–83.
95. To M.S., Skentou C., Cicero S. and Nicolaidis K.H. Cervical assessment at the routine 23–weeks’ scan: problems with transabdominal sonography. *Ultrasound Obstet. Gynecol.* 2000;15: 292–6.
96. Goldenberg RL, Andrews W, Mercer B et al. The preterm prediction study: Granulocyte colony-stimulating factor and spontaneous preterm birth. *Am. J. Obstet. Gynecol.* 2000; 182: 625–3
97. Espinoza J, Goncalves LF, Romero R, Nien JK, Stites S, Kim YM, Hassan S, Gomez R, Yoon BH, Chaiworapongsa T, Lee W, Mazor M. The prevalence and clinical significance of amniotic fluid “sludge” in patients with preterm labor and intact membranes. *Ultrasound Obstet Gynecol.* 2005;25:346–352. [PubMed]
98. Bujold E, Pasquier JC, Simoneau J, Arpin MH, Duperron L, Morency AM, Audibert F. Intra-amniotic sludge, short cervix, and risk of preterm delivery. *J Obstet Gynaecol Can.* 2006;28:198–202. [PubMed]
99. Kusanovic JP, Espinoza J, Romero R, Goncalves LF, Nien JK, Soto E, Khalek N, Camacho N, Hendler I, Mittal P, Friel LA, Gotsch F, Erez O, Than NG, Mazaki-Tovi S, Schoen ML, Hassan SS. Clinical significance of the presence of amniotic fluid ‘sludge’ in asymptomatic patients at high risk for spontaneous preterm delivery. *Ultrasound Obstet Gynecol.* 2007;30:706–714. [PubMed]

100. Romero R, Gonzalez R, Baumann P, Behnke E, Rittenhouse L, Barberio D, Cotton DB, Mitchell MD. Topographic differences in amniotic fluid concentrations of prostanoids in women in spontaneous labor at term. *Prostaglandins Leukot Essent Fatty Acids*. 1994;50:97–104. [PubMed]
101. Chandiramani M, Shennan AH. Premature cervical change and the use of cervical cerclage. *Fetal Matern Med Rev* 2007; 18 (1): 25–52. Available at <http://search.proquest.com/docview/207443723?accountid=10382>. Accessed July 2013.
102. Lim K, Butt K, Crane JM. SOGC Clinical Practice Guideline. Ultrasonographic cervical length assessment in predicting preterm birth in singleton pregnancies. *J Obstet Gynaecol Can* 2011; 33 (5): 486–99. [Practice Guideline].
103. Andersen HF, Nugent CE, Wanty SD, Hayashi RH. Prediction of risk for preterm delivery by ultrasonographic measurement of cervical length. *Am J Obstet Gynecol* 1990; 163 (3): 859–67.
104. Bergelin I, Valentin L. Normal Cervical changes in parous women during the second half of pregnancy – a prospective, longitudinal ultrasound study. *Acta Obstet Gynecol Scand* 2002; 81 (1): 31–33.
105. Romero R, Nicolaidis K, Conde-Agudelo A, Tabor A, O’Brien JM, Cetingoz E, et al. Vaginal progesterone in women with an asymptomatic sonographic short cervix in the midtrimester decreases preterm delivery and neonatal morbidity: a systematic review and metaanalysis of individual patient data. *Am J Obstet Gynecol* 2012; 206 (2):124. e1-124.e19.
106. Iams JD, Goldenberg RL, Meis PJ, Mercer BM, Moawad A, Das A, et al. The length of the cervix and the risk of spontaneous premature delivery. *N Engl J Med* 1996; 334 (9): 567–73.
107. Mella MT, Berghella V. Prediction of preterm birth: cervical sonography. *Semin Perinatol* 2009; 33 (5): 317–24.
108. Salomon LJ, Diaz-Garcia C, Bernard JP, Ville Y. Reference range for cervical length throughout pregnancy: non-parametric LMS-based model applied to a large sample. *Ultrasound Obstet Gynecol* 2009; 33 (4): 459–64
109. Callen PW. *Ultrasonography in Obstetrics and Gynaecology*. 5th ed. Philadelphia: Saunders Elsevier; 2008.
110. House M, Socrate S. The cervix as a biomechanical structure. *Ultrasound Obstet Gynecol* 2006; 28 (6): 745–49.
111. Taipale PP, Hiilesmaa VV. Sonographic measurement of uterine cervix at 18–22 weeks’ gestation and the risk of preterm delivery. *Obstet Gynecol* 1998; 92 (6): 902–07.
112. Hassan SS, Romero R, Berry SM, Dang b K, Blackwell SC, Treadwell MC, et al. Patients with an ultrasonographic cervical length  $\leq 15$  mm have nearly a 50% risk of early spontaneous preterm delivery. *Am J Obstet Gynecol* 2000; 182 (6): 1458–67.

113. Rozenberg P, Gillet A, Ville Y. Transvaginal sonographic examination of the cervix in asymptomatic pregnant women: review of the literature. *Ultrasound Obstet Gynecol* 2002; 19 (3): 302–11.
114. Hassan SS, Romero R, Vidyadhari D, Fusey S, Baxter JK, Khandelwal M, et al. Vaginal progesterone reduces the rate of preterm birth in women with a sonographic short cervix: a multicenter, randomized, double-blind, placebo-controlled trial. *Ultrasound Obstet Gynecol* 2011; 38 (1): 18–31
115. Campbell S. Universal cervical-length screening and vaginal progesterone prevents early preterm births, reduces neonatal morbidity and is cost saving: doing nothing is no longer an option. *Ultrasound Obstet Gynecol* 2011; 38 (1): 1–9.
116. Hyett DJ. Australasian Society for Ultrasound in Medicine 41st Annual Congress. Risk Assessment if Preterm Labour and Management, 2011. Crown Conference Centre, Melbourne.
117. Berghella V, Baxter Jason K, Hendrix Nancy W. Cochrane database of systematic reviews. Cervical assessment by ultrasound for preventing preterm delivery Issue 3. New York: John Wiley & Sons, Ltd; 2009
118. Berghella V, Baxter JK, Hendrix NW. Cervical assessment by ultrasound for preventing preterm delivery. In: *Cochrane Database of Systematic Reviews*. New York: John Wiley & Sons, Ltd; 1996
119. Salomon LJ, Alfirevic Z, Berghella V, Bilardo C, Hernandez-Andrade E, Johnsen SL, et al. Practice guidelines for performance of the routine mid-trimester fetal ultrasound scan. *Ultrasound Obstet Gynecol* 2011; 37 (1): 116–26.
120. Olson Chen C, Hackney DN. Ultrasound for cervical length. *Ultrasound Clin* 2013; 8: 1–11.
121. To MS, Skentou C, Chan C, Zagaliki A, Nicolaides KH. Cervical assessment at the routine 23-week scan: standardizing techniques. *Ultrasound Obstet Gynecol* 2001; 17 (3): 217–19.
122. Saul LL, Kurtzman JT, Hagemann C, Ghamsary M, Wing DA. Is transabdominal sonography of the cervix after voiding a reliable method of cervical length assessment? *J Ultrasound Med* 2008; 27 (9): 1305–11.
123. Stone PR, Chan EH, McCowan LM, Taylor RS, Mitchell JM. on behalf of the SC. Transabdominal scanning of the cervix at the 20-week morphology scan: Comparison with transvaginal cervical measurements in a healthy nulliparous population. *Aust N Z J Obstet Gynaecol* 2010; 50 (6): 523–27.
124. Hernandez-Andrade E, Romero R, Ahn H, Hussein Y, Yeo L, Korzeniewski SJ, et al. Transabdominal evaluation of uterine cervical length during pregnancy fails to identify a substantial number of women with a short cervix. *J Matern Fetal Neonatal* 2012; 25: 1682–89.
125. Friedman AM, Srinivas SK, Parry S, Elovitz MA, Wang E, Schwartz N. Can transabdominal ultrasound be used as a screening test for short cervical length? *Am J Obstet Gynecol* 2013; 208 (3): 190.e1–190.e7.

126. Carr DB, Smith K, Parsons L, Chansky K, Shields LE. Ultrasonography for cervical length measurement: agreement between transvaginal and translabial techniques. *Obstet Gynecol* 2000; 96 (4): 554–58.
127. Cicero S, Skentou C, Souka A, To MS, Nicolaides KH. Cervical length at 22–24 weeks of gestation: comparison of transvaginal and transperineal-translabial ultrasonography. *Ultrasound Obstet Gynecol* 2001; 17: 335–40.
128. Hertzberg BS, Livingston E, DeLong DM, McNally PJ, Fazekas CK, Kliewer MA. Ultrasonographic evaluation of the cervix: transperineal versus endovaginal imaging. *J Ultrasound Med* 2001; 20 (10): 1071–78.
129. Yazici G, Yildiz A, Tiras MB, Arslan M, Kanik A, Oz U. Comparison of transperineal and transvaginal sonography in predicting preterm delivery. *J Clin Ultrasound* 2004; 32 (5): 225–30
130. Ozdemir I, Demirci F, Yucel O. Transperineal versus transvaginal ultrasonographic evaluation of the cervix at each trimester in normal pregnant women. *Aust N Z J Obstet Gynaecol* 2005; 45 (3): 191–94.
131. Meijer-Hoogeveen M, Stoutenbeek P, Visser GH. Transperineal versus transvaginal sonographic cervical length measurement in second- and third-trimester pregnancies. *Ultrasound Obstet Gynecol* 2008; 32 (5): 657–62.
132. Raungrongmorakot K, Tanmoun N, Ruangvutilert P, Boriboonhirunsarn D, Tontisirin P, Butsansee W. Correlation of uterine cervical length measurement from transabdominal, transperineal and transvaginal ultrasonography. *J Med Assoc Thai* 2004; 87 (3): 326–32.
133. Clement S, Candy B, Heath V, To M, Nicolaides KH. Transvaginal ultrasound in pregnancy: its acceptability to women and maternal psychological morbidity. *Ultrasound Obstet Gynecol* 2003; 22 (5): 508–14.
134. Lee HJ, Park, Tae Chul, Norwitz, Errol R. Management of pregnancies with cervical shortening: A very short cervix is a very big problem. *Rev Obstet Gynecol* 2009; 2 (2): 107–15.
135. Arisoy R, Murat Y. Transvaginal sonographic evaluation of the cervix in asymptomatic singleton pregnancy and management options in short cervix. *J Pregnancy* 2012; 2012: 201–628.
136. Berghella V, Keeler SM, To MS, Althuisius SM, Rust OA. Effectiveness of cerclage according to severity of cervical length shortening: a meta-analysis. *Ultrasound Obstet Gynecol* 2010; 35 (4): 468–73.
137. Liddiard A, Bhattacharya S, Crichton L. Elective and emergency cervical cerclage and immediate pregnancy outcomes: a retrospective observational study. *JRSM Short Rep* 2011; 2 (11): 91.
138. da Fonseca EB, Damião R, Nicolaides K. Prevention of preterm birth based on short cervix: progesterone. *Semin Perinatol* 2009; 33 (5): 334–37.

139. A, Gupta JK, Kleijnen J, Khan KS. Accuracy of cervical transvaginal sonography in predicting preterm birth: a systematic review. *Ultrasound Obstet Gynecol* 2003; 22:305–322.
140. Hassan SS, Romero R, Berry SM, et al. Patients with an ultrasonographic cervical length  $<$  or  $=$  5 mm have nearly a 50% risk of early spontaneous preterm delivery. *Am J Obstet Gynecol* 2000; 182:1458–1467.
141. Heath VC, Southall TR, Souka AP, Elisseou A, Nicolaides KH. Cervical length at 23 weeks of gestation: prediction of spontaneous preterm delivery. *Ultrasound Obstet Gynecol* 1998; 12:312–317.
142. Werner EF, Han CS, Pettker CM, et al. Universal cervical-length screening to prevent preterm birth: a cost Flood K, Malone FD. *Prevention of preterm birth. Semin Fetal Neonatal Med* 2012; 17:58–63.
143. Lucovnik M, Kuon RJ, Chambliss LR, et al. Progestin treatment for the prevention of preterm birth. *Acta Obstet Gynecol Scand* 2011; 90:1057–1069.
144. Moroz LA, Simhan HN. Rate of sonographic cervical shortening and the risk of spontaneous preterm birth. *Am J Obstet Gynecol* 2012; 206:234.e1–234.e5.
145. Hassan SS, Romero R, Vidyadhari D, et al. Vaginal progesterone reduces the rate of preterm birth in women with a sonographic short cervix: a multicenter, randomized, double-blind, placebo-controlled trial. *Ultrasound Obstet Gynecol* 2011; 38:18–31.
146. Mateus J. Clinical management of the short cervix. *Obstet Gynecol Clin North Am* 2011; 38:367–385, xi–xii.
147. Goldenberg RL. The management of preterm labor. *Obstet Gynecol* 2002; 100:1020–1037.
148. Spong CY. Prediction and prevention of recurrent spontaneous preterm birth. *Obstet Gynecol* 2007; 110:405–415.
149. Honest H, Bachmann LM, Coomarasamy -effectiveness analysis. *Ultrasound Obstet Gynecol* 2011; 38:32–37.
150. Campbell S. Universal cervical-length screening and vaginal progesterone prevents early preterm births, reduces neonatal morbidity and is cost saving: doing nothing is no longer an option. *Ultrasound Obstet Gynecol* 2011; 38:1–9.
151. Rozenberg P, Gillet A, Ville Y. Transvaginal sonographic examination of the cervix in asymptomatic pregnant women: review of the literature. *Ultrasound Obstet Gynecol* 2002; 19:302–311.
152. Berghella V, Baxter JK, Hendrix NW. Cervical assessment by ultrasound for preventing preterm delivery. *Cochrane Database Syst Rev* 2009; 3:CD007235.
153. Lim AC, Goossens A, Ravelli AC, Boer K, Bruinse HW, Mol BW. Utilizing new evidence in the prevention of recurrent preterm birth. *J Matern Fetal Neonatal Med* 2011; 24:1456–1460.

154. Robinson JN, Economy KE, Feinberg BR, Norwitz ER. Cervical hydrosonography in pregnancy to assess cervical length by transabdominal ultrasound. *Obstet Gynecol* 2000; 96:1023–1025.
155. To MS, Skentou C, Cicero S, Nicolaides KH. Cervical assessment at the routine 23-weeks' scan: problems with transabdominal sonography. *Ultrasound Obstet Gynecol* 2000; 15:292–296.
156. Hernandez-Andrade E, Romero R, Ahn H, et al. Transabdominal evaluation of uterine cervical length during pregnancy fails to identify a substantial number of women with a short cervix. *J Matern Fetal Neonatal Med* 2012; 25:1682–1689.
157. Andersen HF. Transvaginal and transabdominal ultrasonography of the uterine cervix during pregnancy. *J Clin Ultrasound* 1991; 19:77–83.
158. Saul LL, Kurtzman JT, Hagemann C, Ghamsary M, Wing DA. Is transabdominal sonography of the cervix after voiding a reliable method of cervical length assessment? *J Ultrasound Med* 2008; 27:1305–1311.
159. Stone PR, Chan EH, McCowan LM, Taylor RS, Mitchell JM. Transabdominal scanning of the cervix at the 20-week morphology scan: comparison with transvaginal cervical measurements in a healthy nulliparous population. *Aust NZ J Obstet Gynaecol* 2010; 50:523–527.
160. Hertzberg BS, Bowie JD, Weber TM, Carroll BA, Kliewer MA, Jordan SG. Sonography of the cervix during the third trimester of pregnancy: value of the transperineal approach. *AJR Am J Roentgenol* 1991; 157:73–76.
161. Hyun-Jin Roh, Yong Il Ji, Chul Hoi Jung, Gyun Ho Jeon, Sungwook Chun, and Hyun Jin Cho. Comparison of Cervical Lengths Using Transabdominal and Transvaginal Sonography in Midpregnancy *JUM* October 2013 32:1721-1728.

## الملخص العربي

الولادة المبكرة هي الولادة قبل الاسبوع السابع والثلاثون من الحمل وتتراوح نسبه حدوثها ما بين ٥% الي ١١% من حالات الحمل، باقل معدل بأيرلنده يصل الي ٤,٥% واعلي معدلاتها بالولايات المتحده الامريكه يصل الي ١٥%

وتتسبب الولادة المبكرة في كثير من الامراض في حديثي الولادة وايضا قد تؤدي الي الوفاة فالطفل الناتج عنها معرض الي الوفاة بمقدار ٤٠ ضعف الطفل العادي.

الهدف من هذه الدراسه هو مقارنة اربع طرق من الموجات الصوتيه للاكتشاف المبكر للولاده المبكره عن طريق قياس طول عنق الرحم:

١. عن طريق البطن والمثانه البولييه ممتلأه.

٢. عن طريق البطن والمثانه نصف ممتلأه.

٣. عن طريق منطقه العجان.

٤. عن طريق المهبل.

وتم عمل هذه الدراسه علي ٢٠٠ سيده حامل في مستشفى الشاطبي الجامعي للتوليد و امراض النساء ما بين الاسبوع ال ٢٠ و ٢٦.

وتم تلخيص النتائج كالتالي:-

١. القياس المهلي لعنق الرحم كان اطول القياسات متبوع بالقياس العجاني ثم عن طريق البطن والمثانه ممتلأه ثم عن طريق البطن والمثانه نصف ممتلأه.

٢. واثبتت النتائج ارتباط ايجابي بين طرق القياس.

٣. وتوصلنا الي معادله حسابيه تمكنا من خلالها حساب طول عنق الرحم المهلي عن طريق اي قياس من القياسات حيث انه ادق قياس وهكذا نتوصل لقيمته دون شعور الحاله بالم او عدم ارتياح وكانت المعادلات كالتالي:

١- القياس العجاني هو X

والمهلي Y

$$Y=54.32-42.64X+13.1658(X)^2-1.76(X)^3+0.087(X)^4$$

٢- القياس البطني مع امتلاء المثانه X

$$Y=1/(-0.038X +0.36504338)$$

٣- القياس البطني والمثانه نصف ممتلأه X

$$Y=1/(-0.040004474X+0.36019382)$$

وهكذا يمكن استخدام الموجات الصوتيه عن طريق البطن مبدأيا للكشف المبكر عن طول عنق الرحم مع الاخذ في الاعتبار حاله الام والجنين. واستخدام الموجات الصوتيه المهليه فقط اذا لزم الامر وهكذا يمكننا وضع اسلوب بسيط ومرتب خطوه بخطوه للكشف عن طول عنق الرحم دون عناء للحاله وكذلك ابسط للطبيب

وتوصي الدراسة بالتالي:

١. -استخدام الموجات الصوتيه عن طريق البطن كطريقه للكشف المبدي عن طول عنق الرحم.
٢. -استخدام الموجات الصوتيه المهليه في حالات الضرره فقط.
٣. اتباع هذا النظام خطوه بخطوه لتوفير اقصي راحه للمريضه.
٤. الدراسات المستقبليه لابد ان تركز علي الاوقات المناسبه لفحص الحاله الروتيني بالموجات الصوتيه عن طريق البطن للكشف عن طول عنق الرحم لتحقيق اقصي فائده للحاله.



# مقارنة بين الطرق المختلفة لقياس طول عنق الرحم بالموجات الصوتية خلال فترة الحمل

رسالة علمية

مقدمة لكلية الطب – جامعة الإسكندرية  
إيفاءً جزئياً لشروط الحصول على درجة

الماجستير في التوليد وأمراض النساء

مقدمة من

سعاد محمد الشرنوبى بسيونى

بكالوريوس الطب والجراحة – جامعة الإسكندرية

كلية الطب

جامعة الإسكندرية

٢٠١٥

# مقارنة بين الطرق المختلفة لقياس طول عنق الرحم بالموجات الصوتية خلال فترة الحمل

مقدمة من

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بكالوريوس الطب والجراحة- الإسكندرية

للحصول على درجة

الماجستير فى التوليد وأمراض النساء

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