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### Summary of Evidence and Issues

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There is great interest in an apparent association of periodontal disease (PD, or periodontitis) with preterm birth (PTB), for which the first evidence was reported in 1996.<sup>1</sup> PD is a common bacterial disease of the gums, for which good treatments exist. Therefore if PD is among the causes of PTB, treating it before or during pregnancy might prevent some proportion of prematurity.

Evidence for an association of PD with PTB is intriguing, but such a link is not yet established. Also, there is a plausible theory of how PD may increase risk of PTB. However, it is far from clear that treating PD before or during pregnancy can reduce risk of PTB. Further research is needed to prove any causal link between oral disease and prematurity, identify mechanism(s) involved, and assess potential for periodontal treatments to improve pregnancy outcomes. As of 2003 two large, federally funded studies have begun to address those questions.

The March of Dimes encourages such research and looks forward to helpful findings. While results are pending, the March of Dimes emphasizes that oral health is an essential aspect of general health and encourages women to make it a part of their preconceptional and prenatal health care, including daily dental self-care, and periodic, professional screening for oral disease, with treatment as needed. However, apart from well-designed research protocols, dental or periodontal care cannot yet be considered an intervention to prevent prematurity.

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### Research background

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#### Studies linking PD to PTB and low birthweight:

- Two small studies of women at the time of delivery suggested that PD is associated with sevenfold increased risk of preterm low birthweight,<sup>1</sup> and that poor oral health is associated with more than threefold risk of low birthweight.<sup>2</sup>
- Two subsequent, larger studies looked at maternal PD earlier in pregnancy. One showed women with severe or generalized PD to have more than fourfold risk of delivering before 37 weeks, fivefold risk of delivering before 35 weeks, and sevenfold risk of delivering before 32 weeks.<sup>3</sup> The other showed progressive PD to be associated with up to tenfold

risk of delivering before 28 weeks, in the more severe cases.<sup>4</sup>

- Some doubt lingers, however. A recent study of women at the time of delivery failed to find an association of PD with poor birth outcomes.<sup>5</sup>

In sum, most evidence points to a link between PD and PTB. The apparent association does not prove that PD has a role in causing PTB. That is because various factors seem to predispose to both PD and PTB. Examples are advancing age; diabetes; and especially smoking, which is associated with both greater risk and greater severity of PD.

#### Studies suggesting potential mechanisms and pathways:

In PD, the infected gums are inflamed. Various cell-to-cell signaling molecules that are involved in inflammation, such as prostaglandins, are implicated in triggering preterm labor.<sup>6</sup> Bacteria from infected gums may also spread to the uterus and fetus.<sup>7</sup>

- One study has shown higher prostaglandin levels in fluid from the gums of women having preterm, low-birthweight babies than of those with normal pregnancy outcomes.<sup>8</sup>
- Another study examined maternal and fetal immune responses to bacteria that cause PD. It found that when a mother lacked antibodies to the bacteria but her newborn had antibodies (evidence of fetal infection), there was a 67% rate of PTB. This suggests that absence of protective maternal antibodies allows spread of PD-causing bacteria to the fetus and uterus, triggering PTB.<sup>9</sup>

#### Studies suggesting that treating PD can reduce risk of PTB:

- A recent pilot study of women with PD in the second trimester compared birth outcomes of those receiving periodontal or routine dental cleaning with those receiving no such treatment. Births at less than 35 weeks occurred among 6.3% of untreated women, 4.9% of those receiving routine cleaning, and 2% of those receiving periodontal treatment. The authors concluded that larger trials are needed to achieve statistical significance.<sup>10</sup>

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## Current research

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In March 2003 the National Institute of Dental and Craniofacial Research (NIDCR, part of the National Institutes of Health) began a larger trial of periodontal intervention for pregnant women with severe PD. It is being conducted at sites affiliated with the University of Minnesota, University of Mississippi, University of Kentucky, and Columbia University, and is scheduled to end in 2006. Details are available at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (enter "obstetrics periodontal" in the search box.)<sup>11</sup>

As of June 2003, the NIDCR is sponsoring a five-year trial centered at the University of North Carolina, Duke University, University of Alabama, and University of Texas Health Science Center at San Antonio. For further details, see [www.csc.unc.edu/motor/](http://www.csc.unc.edu/motor/).<sup>12</sup>

## References

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<sup>2</sup> Dasanayake AP. Poor periodontal health of the pregnant woman as a risk factor for low birth weight. *Ann Periodontol* 1998;3:206-12.

<sup>3</sup> Jeffcoat MK, Geurs NC, Reddy MS, et al. Periodontal infection and preterm birth: results of a prospective study. *J Am Dent Assoc* 2001;132(7): 875-80.

<sup>4</sup> Offenbacher S, Lief S, Boggess KA, et al. Maternal Periodontitis and prematurity. Part I: Obstetric outcome of prematurity and growth restriction. *Ann Periodontol* 2001;6(1):164-74.

<sup>5</sup> Davenport ES, Williams CECS, Sterne JAC, et al. Maternal periodontal disease and preterm low birthweight: case-control study. *J Dent Res* 2002;81(5):313-8.

<sup>6</sup> Lockwood CJ. Predicting premature delivery -- no easy task. *N Eng J Med* 2002;346(4):282-4.  
<http://content.nejm.org/cgi/reprint/346/4/282.pdf>

<sup>7</sup> Bearfield C, Davenport ES, Sivapathasundaram V, et al. Possible association between amniotic fluid microorganism infection and microflora in the mouth. *Brit J Ob Gyn* 2002;109(5):527-33.

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<sup>8</sup> Offenbacher S, Jared HL, O'Reilly PG, et al. Potential pathogenic mechanisms of periodontitis-associated pregnancy complications. *Ann Periodontol* 1998;3:233-50.

<sup>9</sup> Madianos PN, Lief S, Murtha AP, et al. Maternal periodontitis and prematurity. Part II: Maternal infection and fetal exposure. *Ann Periodontol* 2001;6(1):175-82.

<sup>10</sup> Jeffcoat MK, Hauth JC, Geurs NC, et al. Periodontal disease and preterm birth: results of a pilot intervention study. *J Periodontol* 2003;74:1214-8.

<sup>11</sup> Online announcement by NIDCR, "Obstetrics and Periodontal Therapy (OPT) Study."

<sup>12</sup> Online announcement by NIDCR, "MOTOR -- Maternal Oral Therapy to Reduce Obstetric Risk."

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