

## CURRICULUM VITAE

William J. O'Brien, B.S., M.S., Ph.D.

### I. EDUCATION

Ph.D. University of Michigan (---)  
Metallurgical Engineering and Dental Materials

M.S. New York University (---)  
Metallurgy, College of Engineering

### II. PROFESSIONAL POSITIONS

#### 1. University of Michigan

Professor of Biologic and Materials Sciences, Bioengineering (1973–Present)

Chairman, Research Committee (1987–1991), School of Dentistry

Director, Surface Science Laboratory, Dental Research Institute (1979–1988)

Associate Professor, Department of Biologic & Materials Sciences (1970–1973)

Member, Intercollegiate Materials Advisory Committee (1992–1995)

Director, Specialized Materials Science Research Center (1993–2000)

Director, NRSA Training Program in Biomaterials (1993–2000)

#### 2. Marquette University

Associate Professor, Department of Mechanical Engineering, School of Engineering, and

Chairman, Dental Materials Department; Director of Biomaterials Research Center (1967–1970)

### III. PROFESSIONAL EXPERIENCE

1. Consultant, S.B.I.R. Grant Application (1988)
2. Consultant, World Health Organization (1967–1968); Consultant, American Dental Association (1967–present)
3. Consultant, N.I.H. Grant Review Committees (1970, 1974, 1988)
4. President, Dental Materials Group, I.A.D.R. (1975)
5. Research Associate, V.A. Hospital, Wood, Wisconsin (1967–1970)
6. Visiting Lecturer, Louisiana State University (1971–1973)
7. Secretary, Dental Materials Group, I.A.D.R. (1970–1974)
8. Chairman, A.D.A. Committee on Ceramic-Alloy Specification (1971–1978)
9. Chairman, A.D.A. Committee on Orthodontic Wire Specification (1967–present)
10. Training Grant Director, N.I.D.R., Marquette University (1967–1970)
11. Member, American National Standards Committee Subcommittee MD156 (1979–1989)
12. Member, Special Emphasis Review Panel, Centers of Biomedical Excellence (COBRE), National Center for Research Resources, NIH, June 11-12, 2002.

13. Member, Advisory Committee, Federal Drug Administration, 2004-2007
14. Consultant, Council on Scientific Affairs, American Dental Association, 2003-2004

#### IV. HONORS

##### A. Awards

United Nations Certificate (1967)  
Quest for Technology, University of Michigan (1983)  
Mexican Prosthodontics Society for Valuable Contributions (1990)  
Teacher of the Year Award, University of Michigan (1991)  
Medallion, Keynote Speaker, Keystone US Air Force (2003)

##### B. Society Memberships

Phi-Kappa-Phi Honor Society in Sciences  
Sigma Xi  
Society of Metals (London)  
New York Academy of Sciences  
I.A.D.R. Adhesion Society  
Academy of Dental Materials

##### C. Citations

American Men and Women of Science, 12th ed.  
Who's Who in Education  
Who's Who in the Midwest  
Who's Who in America

##### D. Rackham Graduate School, University of Michigan

Outstanding Graduate, 50th Anniversary (1988)

#### V. RESEARCH GRANTS

Capillary Phenomena Related to Caries Sites, N.I.D.R., 1972-1978. Total \$300,000.

Diffuse Reflectance by Esthetic Dental Materials, N.I.D.R., 1979-1991. \$756,000.

Surface Science Laboratory – Caries Program, N.I.D.R., 1979-1987. Research related to the development of early diagnosis of caries using optical phenomena. \$220,000.

Strengthening of Ceramics, N.I.D.R., 1989-1994. Part of Specialized Materials Science Research Center. \$625,178.

Diffuse Reflectance by Esthetic Dental Materials, N.I.D.R., 1995-1998, \$646,866.

---Director, 1994-1999, \$---

Restorative Dental Materials, N.I.D.R. Training Grant, Director, 1993– 2000. \$123,000 per year.

Properties of Dental Porcelains, --- 1998-2001, \$---

Properties of Hydrated Porcelains, ---, 2002-2003, \$---

The Effect of Hydration on the Strength of Ceramic Porcelain Crowns. ---,2003-2004, \$

## VI. PATENTS

1. High Expansion Dental Crown Core Ceramic Composition. U.S. Patent #4,576,922 (1986).
2. Surface Finishing Apparatus and Method. U.S. Patent #5,080,588 (1992).
3. Method and Composition for Removing Mercury Vapor from Dental Restorations. U.S. Patent #5,242,305 (1993).
4. Tooth Color Matching System. U.S. Patent #6,007,332 (1999)

## VII. INTERNATIONAL SYMPOSIA

Medical Design; Manufacturing Product Innovation Strategy, Anaheim, California, February 1992.

Conference on Dental Materials, Central University, Caracas, Venezuela. Representative of World Health Organization. 1967.

Symposium on Dental Research and Education, "Physics and Chemistry on Adhesion," University of British Columbia, Vancouver, BC, June 1970.

IADR Symposium on Dental Materials, "Surface Phenomena," London, England, April 1975.

IADR Symposium on Dental Materials, "Penetration Properties of Sealants," Copenhagen, Denmark, March 1977.

IADR Symposium on Esthetics, "Color and Translucency of Esthetic Restorative Materials," Dallas, TX, March 1984.

IADR Symposium on Biomaterial Surfaces, "Optical Phenomena at Interfaces," Chicago, IL, March 1987.

IADR Symposium on Recent Advances in Ceramics, "Ceramic Materials: A New Era," Montreal, March 1988.

International Symposium on Ceramics, Washington, D.C., October 1988.

AADR Symposium on Adhesion, "Fundamentals of Adhesion," Boston, MA, March 1992.

US Air Force Keystone Conference, Evidence Based Approach to Recent Prosthodontic Research, February, 2003, Colorado.

## VIII. SIGNIFICANT RESEARCH CONTRIBUTIONS

1. Surface Phenomena- Several papers were published on the role of wetting and capillary penetration on the bonding of polymers to etched enamel including the calculation of a "penetration coefficient" for pit and fissure sealants, and the elucidation of marginal leakage with basic mathematical models(Ph.D dissertation and subsequent research).
2. Dental Porcelains – Several papers were published on the nature of the original porcelain fused to metal dental systems including the discovery of the hardening mechanism of Au-Pt-Fe alloys ,the first

identification of leucite in these ceramics by X-ray diffraction, along with the role of wetting and oxides in bonding. The O'Brien classification of porcelain-metal failures has become the standard approach in research studies.

3. Color Parameters of Teeth and Shade Matching- Several original papers over the course of a decade were published on the CIE Lab color parameters of teeth and shade guides and the accuracy of color matching. These have become standard data in the literature and became the basis for the development of electronic color matching devices. A new concept and method of calculation of "coverage error" which quantified the error introduced by visual matching with a set of color standards (shade guide) to teeth based on Lab parameters led to the development of improved shade guides. Several papers on the shift of color parameters during photography led to an invention and patent of a method of shade matching still in the development stage.

## IX. PUBLICATIONS

### A. Books: Co-Author, Editor

1. Dental Ceramics, Engineering and Science Proceedings, Jan.-Feb. 1985, Am. Ceram. Soc. (W.J. O'Brien R.G. Craig, Editors).
2. Ceramics. Dental Clinics of North America, Volume 29, W.B. Saunders Co., October 1985 (W.J. O'Brien, Editor).
3. Dental Materials: Properties & Selection, Quintessence, 1989. 2nd ed.1997,3<sup>rd</sup> ed,2002 (W.J. O'Brien, Editor).
4. Ceramics. Restorative Dental Materials, 5th, 6th, 7th, and 8th eds. C.V. Mosby Co., 1975, 1980, 1984, and 1993, respectively. R.G. Craig, ed.
5. Dental Materials: Properties and Manipulation. C.V. Mosby Co., St. Louis, 1975 (R.G. Craig, W.J. O'Brien, J.M. Powers).
6. Outline of Dental Materials and Their Selections. W.B. Saunders Co., 1978 (W.J. O'Brien, Gunnar Ryge, Editors).
7. Dental Materials: A Programmed Review of Selected Topics. W.B. Sanders Co. (200 pages), 1965 (W.J. O'Brien, Gunnar Ryge).

### B. Published Papers

1. Animal study of adhesion and leakage of a carboxylate cement. J. Dent. Res., 50:774, May-June 1971 (W.J. O'Brien, R.J. Espinoza, K.F. Leinfelder, D. Krainik, E. Krainik).
2. Capillary action around dental structures. J. Dent. Res., 52:544-549, 1973 (W.J. O'Brien).
3. Hardening of dental gold-copper alloys. J. Dent. Res., July 1972 (K.F. Leinfelder, W.J. O'Brien, D.F. Taylor).
4. Physics and Chemistry of Adhesion. Symposium on Dental Research and Education, R.G. Stephens, ed., Assoc. of Can. Fac. of Den., June 1971, (W.J. O'Brien).
5. Relation between molecular force calculations and observed strengths of enamel-metal interfaces. J. Amer. Ceram. Soc., 47:5-8, January 1964 (W.J. O'Brien, G. Ryge).

6. Programmed Learning--Psychology and Application. *J. Dent. Educ.*, 27:225-229, September 1963 (W.J. O'Brien, G. Ryge).
7. Wetting characteristics of dental gold solders. *J. Dent. Res.*, 42:675-680, March-April 1963 (W.J. O'Brien, W.M. Hirthe, G. Ryge).
8. Decomposition of gypsum investments in the presence of carbon. *J. Dent. Res.*, 38:531-547, May-June 1959 (W.J. O'Brien).
9. Practical application of current casting research. *J. Prosth. Dent.*, 19:558-560, May-June 1959 (W.J. O'Brien).
10. Elektrochemische korrosion bei goldarbeiten. *Quintessenz*, 10:57-58, Article 1182, February 1959 (W.J. O'Brien).
11. Wettability of poly-(methyl methacrylate) treated with silicon tetrachloride. *J. Prosth. Dent.*, 15:304-308, March-April 1965 (W.J. O'Brien, G. Ryge).
12. Hardening of high-fusing gold alloys. *J. Dent. Res.*, 45:392-396, March-April 1966 (K.F. Leinfelder, W.J. O'Brien, et al.).
13. Evolution of gases from high-fusing gold alloys. *J. Dent. Res.*, 45:1154-1158, July-August 1966 (K.F. Leinfelder, C.W. Fairhurst, W.J. O'Brien, et al.).
14. Capillary penetration between dissimilar solids. *J. Coll. Interface Sci.*, April 1968 (W.J. O'Brien, R.G. Craig, F.A. Peyton).
15. Capillary penetration around a hydrophobic filling material. *J. Prosth. Dent.*, 19:399-405, April 1968 (W.J. O'Brien, R.G. Craig, F.A. Peyton).
16. Significant advancements in dental materials. *J. Conn. State Dent. Assn.*, 42:117-122, July 1968 (W.J. O'Brien).
17. Effect of an elastic lining on the retention of dentures. *J. Prosth. Dent.*, 20:498-505, December 1968 (B.J. Battersby, D.H. Gehl, W.J. O'Brien).
18. Mechanical properties of high-fusing gold alloys. *J. Prosth. Dent.*, 21:523-528, May 1969 (K.F. Leinfelder, W.J. Servais, W.J. O'Brien).
19. Tensile strength of interface between porcelain fused to gold. *J. Biomed. Mater. Res.*, 3:403-408, 1969 (M. Kelley, K. Asgar, W.J. O'Brien).
20. Surface energy of liquids isolated in narrow capillaries. *Surface Sci.*, 19:387-395, 1970 (W.J. O'Brien).
21. Surface energy of liquids isolated in narrow capillaries. *Surface Sci.*, 23:428-431, 1970 (W.J. O'Brien).
22. Anomalous behavior of liquids in isolated contact with solids. *Surface Sci.*, 25:298-304, 1971 (W. J. O'Brien).
23. Physical properties of a nickel-chromium alloy for enamel veneering. *J. Dent. Res.*, 50:508, 1971 (W.J. O'Brien).
24. Mechanical properties of a hydrophilic acrylic polymer. *J. Biomed. Mater. Res.*, 6:15-24, 1972 (W.J. O'Brien, J. Hermann).
25. Tensile strength of liquid bridges under reduced pressure. *Surface Sci.*, 1972 (W.J. O'Brien, C.U. Yu).

26. Empirical equation of estimating the area of a maxillary edentulous jaw. *J. Dent. Res.*, 52:725-730, 1972 (H. Mohammed, W.M. Johnston, W.J. O'Brien).
27. An electrical resistance study of the precipitation reaction in a gold-platinum-iron alloy. *J. Biomed. Mater. Res.*, 7:497-506, 1973 (J.R. Sims, R.N. Blumenthal, W.J. O'Brien).
28. Precipitation hardening in gold-platinum alloys containing small quantities of iron. *J. Biomed. Mater. Res.*, 7:471-480, 1973 (R.A. Fuys, C.W. Fairhurst, W.J. O'Brien).
29. Transverse strength of aluminous and feldspathic porcelain. *J. Dent. Res.*, 53:683-690, 1974 (C.A. Sherrill, W.J. O'Brien).
30. Heat treatment of alloys to be used for the fused porcelain technique. *J. Prosth. Dent.*, 14:955-960, September-October 1964 (W.J. O'Brien, J.E. Kring, G. Ryge).
31. Ein Blick auf die Bedeutung der Eigenschaften der Goldlegierungen. *Quintessenz*, 10:35-37, Article 1278, September 1959 (W.J. O'Brien).
32. Contact angles of drops of enamel on metals. *J. Prosth. Dent.*, 15:1094-1100, November-December 1965 (W.J. O'Brien, G. Ryge).
33. Capillary Effects in Adhesion. *Proc. Conf. on Dental Adhesive Materials*, H.D. Moskowitz, ed. New York Univ., 1973.
34. Penetrativity of Sealants, I. *J. Dent. Res.*, 54:262-264, 1973 (P.L. Fan, L.W. Seluk, W.J. O'Brien).
35. The strength of liquid bridges between dissimilar materials. *J. Adhesion*, 5:91-103, 1973 (W.J. O'Brien, J. Hermann).
36. Strain resulting from adhesive action of water in capillary bridges. *Nature*, 256:717-718, August 1975 (P.L. Fan, W.J. O'Brien).
37. Capillary adhesion. *Adhesion Science and Technology*, 621-633, 635-646, 1975, Plenum Publishing Corp., New York, L.H. Lee, ed.
38. Surface properties of dental amalgam. *J.A.D.A.*, 94:891-894, 1977 (W.J. O'Brien, W. Johnston, D.E. Heinkel).
39. Wetting of amalgam alloys by Mercury. *J.A.D.A.*, 94:898-900, 1977 (G. Baran, W.J. O'Brien).
40. Sintering of dental porcelain enamels. *J. Dent. Res.*, 55:696-699, 1975 (J.M. Meyer, W.J. O'Brien, C.U. Yu).
41. Surface finish of dental composite restorative materials. *J. Biomed. Mater. Res.*, Vol. 12, January 1978 (L.G. Tolley, W.J. O'Brien, J.B. Dennison).
42. Penetrativity of sealants and glazes. *Operative Dent.*, 3:51-56, 1978 (W.J. O'Brien, P.L. Fan, A. Apostolidis).
43. Effects of capillary penetration and negative pressure at sites of caries susceptibility. *Proc. Microbial Aspects of Dental Caries*, Vol. II. Information Retrieval, Inc., Washington, D.C., 1975 (W.J. O'Brien).
44. Energy transfer between rare earth ions in a potassium feldspar glass. *J. Electrochem. Soc.*, 124:309-312, 1977 (G. Baran, T.Y. Tien, W.J. O'Brien).
45. Evolution of dental casting. In T.M. Valega, ed., *Alternatives to Gold Alloys in Dentistry*. DHEW Pub. No. (NIH) 77:1227, September 1977 (W.J. O'Brien).

46. Colored emission of rare earth ions in a potassium feldspar glass. *J. Dent. Res.*, 56:1323-1329, November, 1977 (G.R. Baran, W.J. O'Brien, T.Y. Tien).
47. Dental porcelains. In R.G. Craig, ed., *Dental Materials Review*, University of Michigan Press, Ann Arbor, MI, 1977 (W.J. O'Brien).
48. Effect of hydrostatic tensile stress on the growth of *Escherichia Coli and Bacillus Cereus*. *Appl. and Environ. Microbio.*, 36:549-551, October 1978 (W.J. O'Brien, M.C. Walker, P.L. Fan, W.M. Johnston).
49. Adsorption of *Streptococcus Mutans* on chemically treated Hydroxyapatite. *J. Dent. Res.*, 57:910-914, October 1978 (W.J. O'Brien, P.L. Fan, W.J. Loesche, M.C. Walker, IV, A. Apostolidis).
50. Surface morphologies of chemically treated Hydroxyapatite. *J. Dent. Res.*, 58:1566-1569, June 1979 (P.L. Fan, W.J. O'Brien, M.C. Walker).
51. Wetting properties of sealants and glazes. *Operative Dent.*, 4:100-103, Summer 1979 (P.L. Fan, W.J. O'Brien, R.G. Craig).
52. Penetrativity and wetting topical fluoride preparations: an *in vitro* study. *Clin. Prevent. Dent.*, 1:11-13, November-December 1979 (E.P. Strach, P.L. Fan, W.J. O'Brien).
53. Base retention. *Dent. Clin. N.A.*, 24:123-130, January 1980 (W.J. O'Brien).
54. Microstructure of posterior restorations of composite resin after clinical wear. *Operative Dent.*, 5:90-94, Summer 1980 (W.J. O'Brien, J. Yee, Jr.).
55. The shear strength of dental porcelains. *J. Dent. Res.*, 59:1409-1411, 1980 (W.M. Johnston, W.J. O'Brien).
56. Optical properties of direct restorative materials. *J. Dent. Res.*, 60:890-894, May 1981 (Y. Miyagawa, J.M. Powers, W.J. O'Brien).
57. Translucency of human dental enamel. *J. Dent. Res.*, 60:1749-1753, 1981 (R.H.W. Brodbelt, W.J. O'Brien, P.L. Fan, J.G. Frazier-Dib, R. Yu).
58. Detection of enamel demineralization with transillumination. *Clin. Prevent. Dent.*, 3:12-14, 1981 (P.J. Parker, P.L. Fan, W.J. O'Brien, S.L. Brooks).
59. Color analysis of dental modifying porcelains. *J. Dent. Res.*, 61(3):484-488, March 1982 (W.M. Johnston, W.J. O'Brien).
60. The assessment of Chroma sensitivity to porcelain pigments. *J. Prosthet. Dent.*, 49:63-66, January 1983 (W.J. O'Brien, D. Nelson, R.E. Lorey).
61. The application of blue polymer curing lights for diagnostic transillumination. *J.A.D.A.*, 106:839-842, June 1983 (W.J. O'Brien, J. Yee, Jr., J.B. Dennison, W.M. Johnston, R. Stefanski, W.J. Yee, F. Fanian).
62. The surface roughness and gloss of composites. *J. Dent. Res.*, 63:685-688, May 1984 (W.J. O'Brien, W.M. Johnston, F. Fanian, S. Lambert).
63. A critical appraisal of dental adhesion testing. *Adhesive Joints*, Plenum Publishing Corp., pp. 289-305, 1984 (W.J. O'Brien, S.T. Rasmussen).
64. Use of a dual filter-mirror device with a fluorescent plaque disclosant. *Clin. Preven. Dent.*, 6:13-16, May-June 1984 (W.J. O'Brien, F. Fanian).

65. Masking power of dental opaque porcelains. *J. Dent. Res.*, 63:936-939, June 1984 (G.D. Woolsey, W.M. Johnston, W.J. O'Brien).
66. Thermal stress failure of porcelain bonded to a Palladium-Silver alloy. *J. Dent. Res.*, 64(3):476-480, March 1985 (T.R. Walton, W.J. O'Brien).
67. Double-layer color effects in porcelain systems. *J. Dent. Res.*, 64(6):940-943, June 1985 (W.J. O'Brien, W.M. Johnston, F. Fanian).
68. Research in esthetics related to ceramic systems. *Ceram. Engr. and Sci. Proc.*, 6(1-2):57-65, January-February 1985 (W.J. O'Brien).
69. High expansion feldspar porcelain and magnesia core materials. *Ceram. Engr. and Sci. Proc.*, 6(1-2):10-18, January-February 1985 (W.J. O'Brien).
70. Double layer effect and other optical phenomena related to esthetics. *Dent. Clin. N. Am.*, 29(4):667-672, October 1985 (W.J. O'Brien).
71. Magnesia ceramic jacket crowns. *Dent. Clin. N. Am.*, 29(4):719-723, October 1985 (W.J. O'Brien).
72. A critical appraisal of dental adhesion testing. *Adhesive Joints*. K.L. Mittal, ed. (W.J. O'Brien, S.T. Rasmussen).
73. Dental amalgam. W.J. O'Brien, E. Greener, and D. Mahler. *Restorative Dental Materials: An Overview*, vol. 1. Resse, J.A. and Valega, T.M., eds. Quintessence, 1985.
74. The determination of optical absorption and scattering in translucent porcelain. *Color Res. and Appl.*, 11(2):125-130, Summer 1986 (W.M. Johnston, W.J. O'Brien, T.Y. Tien).
75. Light scattering and gloss of an experimental quartz-filled composite. *J. Dent. Res.*, 65(6):892-894, June 1986 (P.M. Campbell, W.M. Johnston, W.J. O'Brien).
76. Concentration additivity of Kubelka-Munk optical coefficients of porcelain mixtures. *Color Res. and Appl.*, 11:131-37, Summer 1986 (W.M. Johnston, W.J. O'Brien, T.Y. Tien).
77. Spectrophotometric analysis of color differences between porcelain systems. *J. Prosthet. Dent.*, 56:35-38, 1986 (R.R. Seghi, W.M. Johnston, W.J. O'Brien).
78. Dental porcelains. *Encyclopedia of Materials Science and Engineering*, 1099-1102, 1986, Pergamon Press, M.B. Bever, ed.
79. Fraunhofer diffraction of light by human enamel. *J. Dent. Res.*, 67(3):484-486, 1988 (W.J. O'Brien).
80. The strength of alumina and magnesia core crowns. *Int. J. Prosthodont.*, 1:67-72, 1988 (S.O. Hondrum, W.J. O'Brien).
81. Strength of a high expansion core porcelain. *Perspectives in Dental Ceramics. Proceedings of the Fourth International Symposium on Ceramics*. Preston, J.D., ed. Quintessence Pub. Co., Chicago, 1988.
82. The detection of incipient caries and tracer dyes. *J. Dent. Res.*, 68:157-158, 1989 (W.J. O'Brien, L. Vazquez, W.M. Johnston).
83. The color of mixtures of dental opaque porcelains. *J. Dent. Res.*, 68:1319-1322, 1989 (J.M. White, W.J. O'Brien).
84. A one-dimensional color order system for dental shade guides. *Dent. Mater.*, 5:371-374, 1989 (W.J. O'Brien, C.L. Groh, K.M. Boenke).



85. Performance assessment of colorimetric devices on dental porcelains. *J. Dent. Res.*, 68:1755-1759, 1989 (R.R. Seghi, W.M. Johnston, W.J. O'Brien).
86. Dental porcelain. *Concise Encyclopedia of Medical and Dental Materials*, 149-152, 1990, Pergamon Press, D. Williams, ed.
87. A new, small-color-difference equation for dental shades. *J. Dent. Res.*, 69:1762-1764, 1990. (W.J. O'Brien, C.L. Groh, K.M. Boenke).
88. Coverage errors of two shade guides, *Int. J. Prosthodont.*, 4:45-50, 1991 (W.J. O'Brien, K.M. Boenke, C.L. Groh).
89. Sources of color variation on firing porcelain. *Dent. Mater.* 7:170-173, 1991 (W.J. O'Brien, K.-S. Kay, K.M. Boenke, C.L. Groh).
90. Differences in color between fired porcelain and shade guides. *Int. J. Prosthodont.* 5:510-514, 1992 (C.L. Groh, W.J. O'Brien, K.M. Boenke).
91. Fracture-surface analysis of a glaze-strengthened magnesia core material. *Int. J. Prosthodont.* 5:475-478, 1992 (W.C. Wagner, W.J. O'Brien, G.P. Mora).
92. Strength of magnesia-core crown with different body porcelains, *Int. J. Prosthodont.*, 6:60-64, 1993 (Ching-Cheng Liu, W.J. O'Brien).
93. The strengthening mechanism of a magnesia core ceramic. *Dent. Mater.* 9:242-245, 1993 (W.J. O'Brien, C.L. Groh, K.M. Boenke, G.P. Mora, T.Y. Tien).
94. Marginal fit of all-ceramic core crowns made with platinum foil and refractory die methods. *Esthetic Dent.* 4:138-142, 1993 (G. Mora, W.J. O'Brien, E. Lazar)
95. Esthetic materials with active agent control release capabilities and their future roles. In: *Symposium on Esthetic Restorative Materials*, 1991. Chicago: American Dental Association, 1993, pp 136-138 (W.J. O'Brien, C.L. Groh).
96. Color difference coefficients of body-opaque double layers. *Int. J. Prosthodont.* 7:56-61, 1994 (W.J. O'Brien, P.L. Fan, C.L. Groh).
97. Thermal shock resistance of core reinforced all-ceramic crown systems. *J. Biomed. Mater. Res.* 28:189-194, 1994 (G.P. Mora, W.J. O'Brien).
98. Mechanical properties and thermal expansion behaviour in leucite containing materials. *J. Materials Science* 29:124-128, 1994 (T.S. Sheu, S.T. Rasmussen, W.J. O'Brien, T.Y. Tien).
99. Leucite content of selected dental porcelains. *J. Biomed. Mat. Res.* 28:603-609, 1994 (P.W. Piché, W.J. O'Brien, C.L. Groh, K.M. Boenke).
100. Effect of parallel surface cuts on bonding to dentine. *Int. J. Adhesion and Adhesives* 14:175-179, 1994 (W.J. O'Brien, C.L. Groh, S.E. Strawn).
101. Evaluation of some properties of an opaque porcelain fired simultaneously with the body porcelain. *J. Prothodont. Dent.* 72:414-419, 1994 (W.J. O'Brien, K.M. Boenke, C.L. Groh)
102. Properties of leucite-glass composites prepared by a coprecipitation process. *J. Maters. Res.* 9:2285-2289, 1994 (C.K. Yoon, S.T. Rasmussen, W.J. O'Brien, T.-Y. Tien)
103. Optimum particle size distribution for reduced sintering shrinkage of a dental porcelain. *Dent. Mater.* 13:43-50, 1997 (S. T. Rasmussen, W. Ngaji-Okumu, K. Boenke, W. J. O'Brien)
104. Color distribution of three regions of extracted human teeth. *Dent. Mater.* 13(3):179-85, 1997 (W.J. O'Brien, H. Hemmendinger, K.M. Boenke, J.B. Linger, C.L. Groh)

105. Stress induced phase transformation of a cesium stabilized leucite porcelain and associated properties. *Dent. Mater.* 14(3):202-11, 1998 (S.T. Rasmussen, C.L. Groh, W.J. O'Brien)
106. Cerium oxide as a silver decolorizer in dental porcelains. *Dent. Mater.* 14:365-369, 1998 (W.J. O'Brien, K.M. Boenke, J.B. Linger, C.L. Groh)
107. Depth-resolved Raman microprobe examination of a commercial dental porcelain exposed to a simulated oral environment. *Dent. Mater.* 14:375-382, 1998 (N.L. Jestel, M.D. Morris, W.J. O'Brien)
108. Fracture strength of glass infiltrated-magnesia core porcelain. *Int. J. Prosthodont.* 12(1):38-44, 1999 (D.B. Evans, W.J. O'Brien)
109. Investigation of two mercury vapor collection techniques. *Dent. Mater.* 15:375-381, 1999 (A.L. Neme, J.D. McLaren, W.J. O'Brien)
110. Effects of palladium addition on emission of mercury vapor from dental amalgam *Dent Mater* 15:382-389, 1999 (A.M. Neme, W.C. Wagner, W.J. O'Brien).
111. Strengthening mechanisms of current dental porcelains. *Compendium*, 21:625- 630, 2000
- 112 Mechanical Properties of Glass-only Porcelains Prepared by the Use of Two Feldspathic Frits with Different Thermal Properties ( M. Kon, W. J. O'Brien, S.T. Rasmussen, & K. Asaoka, *J. Dent Res* 80: 1758-1763, August, 2001)
113. Adsorption of Catechol and Comparative Solutes on Hydroxyapatite. (Chiridon, W.M, O'Brien, W.J., Robertson, R.E.), *J. Biomed. Matls. Res.* Spring 2003.
114. The Effect of Cesium Containing Leucite Additions on the Thermal and Mechanical Properties of Two Leucite-Based Porcelains (Rasmussen, ST, McLaren, CI, and O'Brien, WJ, *J of Biomedical Materials Research*, 69B(2):195-204, 2004
115. In vitro human enamel wear by a hydrated high alkali porcelain surface layer, (O'Brien, WJ, O'Kray, H, and Boenke, K, *Quintessence International*, Accepted for publication, 2003.
116. Diffuse Reflectance of Short-Fiber-Reinforced Composites Aligned by an Electric Field (Chiridon, W.M, O'Brien, W.J. & Robertson, R.E.). *Dental Materials*, Accepted for publication,
117. Fraunhofer Diffraction of Short-Fiber-Reinforced Composites (Chiridon, WM, O'Brien, WJ, and Robertson, RE. *Dental Materials*, Accepted for Publication in April 2005.

#### C. Recent Attendance at Scientific/Professional Meetings & Presentations

- Effect of Palladium on Emission of Mercury Vapor from Dental Amalgam (A.L. Neme, W.C. Wagner, W.J. O'Brien), *AADR* 1998, Minneapolis, MN, March 1998.
- Accuracy of Color Reproduction for Five Different Slide Films (K.M. Boenke, W.J. O'Brien, R.E. Lorey), *IADR* 1998, Nice, France June 1998.
- Transformation of Color Parameters During an Imaging Procedure (E.A. Tashkandi, W.J. O'Brien), *IADR* 1998, Nice, France June 1998.
- Chromaticity of Dental Shade Matching Lights (H. Haerian, K.M. Boenke, R.E. Lorey, W.J. O'Brien), *IADR* 1998, Nice, France June 1998.
- Effect of High-Fusing Glass Particles on Strength of Glass Porcelain (M. Kon, W.J. O'Brien, S.T. Rasmussen), *IADR* 1998, Nice, France June 1998.

- Reduced Mercury Vapor Emission from Amalgams Condensed Against Various Metals (W.J. O'Brien, C.L. Groh, C.R. Burns), IADR 1998, Nice, France June 1998.
- A New Microwear Test Applied to a Hydrated Glass (S.T. Rasmussen, W.J. O'Brien), IADR 1999, Vancouver, BC, Canada, March 1999.
- Effect of Palladium on Mercury Vapor Release from Dental Amalgam (A.L. Neme, W.J. O'Brien), IADR 1999, Vancouver, BC, Canada, March 1999.
- Calculated Dimensions of 3-Unit Fixed Partial Dentures (E. Tashkandi, W.J. O'Brien, E.E. Hill), IADR 1999, Vancouver, BC, Canada, March 1999.
- Coverage Error of a New Three Dimensional Shade Guide (K.M. Boenke, W.J. O'Brien), IADR 1999, Vancouver, BC, Canada, March 1999.
- Photocolorimetry using the Spectral Color Transformation Model (W.J. O'Brien, C.L. Groh, E. Tashkandi), IADR 1999, Vancouver, BC, Canada, March 1999.
- Photocolorimetry: A Method for Matching the Color of Teeth (C.L. Groh, W.J. O'Brien, H.P. O'Kray), IADR 1999, Vancouver, BC, Canada, March 1999.
- In Vitro Human Enamel Wear by a hydrated High Alkali Porcelain ( H. P. O'Kray, and W.J. O'Brien, IADR, 2002, San Diego, March, 2002
- Photocolorimetric Measurements for Clinical Shade Matching of Porcelain Crowns ( W,K. Dancy, W. J. O'Brien, et al, IADR 2002,San Diego, March 2002, Abstract #2543)
- Measuring the true color of human gingiva; A spectrophotometric assessment of gingival color and clinical gingivitis ( H.A. Haerian & W. J. O'Brien, IADR, San Diego, March 2002,Abstract # 0979)
- Evidence Based Approach Applied to Prosthodontics, Invited Speaker, US Air force Keystone Conference, Colorado, Feb.2003
- Fraunhofer Diffraction in Composites Aligned by Dielectrophoresis, Annual Symposium of Macromolecular Science Institute, Oct. 2002, Ann Arbor
- Adsorption of Catechol and Comparative Solutes on Hydroxyapatite, (Chirdon,W.M.,O'Brien,W.J. and Robertson,R.E., AADR, San Antonio, March 2003