Abou-Rass, M. and S. W. Oglesby (1981). "The effects of temperature, concentration, and tissue type on the solvent ability of sodium hypochlorite." Journal of Endodontics **7**(8): 376-7.

Berutti, E. and R. Marini (1996). "A scanning electron microscopic evaluation of the debridement capability of sodium hypochlorite at different temperatures." J Endod **22**(9): 467-70.

The effect of raising the temperature of the irrigant solution on the smear layer was evaluated in the middle and apical third of 22 human upper incisors. A 5% sodium hypochlorite (NaOCl) solution was used at 21 degrees C and at 50 degrees C. After hand instrumentation and treatment with the irrigant, teeth were fractured into halves and examined by scanning electron microscopy. Characteristics of the smear layer in the two groups of specimens were compared. In the middle third, where NaOCl had been used at 50 degrees C, the smear layer was thinner and made of finer, less well-organized particles than where it had been used at 21 degrees C. In the apical third, the smear layer was of almost the same thickness in the two groups of specimens, although the particles were finer where the NaOCl had been used at 50 degrees C.

Cunningham, W. T. and S. W. Joseph (1980). "Effect of temperature on the bactericidal action of sodium hypochlorite endodontic irrigant." Oral Surgery, Oral Medicine, Oral Pathology **50**(6): 569-71.

When the in vitro bactericidal action of 2.6 percent sodium hypochlorite endodontic irrigating solution was compared at room temperature (22 degrees C.) and at body temperature (37 degrees C.), sterility was achieved in significantly less time at 37 degrees C.

Cunningham, W. T. and A. Y. Balekjian (1980). "Effect of temperature on collagen-dissolving ability of sodium hypochlorite endodontic irrigant." Oral Surgery, Oral Medicine, Oral Pathology **49**(2): 175-7.

The collagen-dissolving ability of both 2.6% and 5.2% sodium hypochlorite endodontic irrigating solutions was compared at room temperature (21 degrees C) and body temperature (37 degrees C). The 2.6% sodium hypochlorite solution at a temperature of 37 degrees C. was found to be equally effective as a collagen-dissolving agent when compared to 5.2% sodium hypochlorite at either 21 degrees C. or 37 degrees C.

Johnson, B. R. and N. A. Remeikis (1993). "Effective shelf-life of prepared sodium hypochlorite solution." Journal of Endodontics **19**(1): 40-3.

Although the tissue solvent and bactericidal properties of sodium hypochlorite are well known, the effective shelf-life of prepared sodium hypochlorite solutions is not known. The stability of sodium hypochlorite is adversely affected by exposure to high temperature, light, air, and the presence of organic and inorganic contaminants. The purpose of this study was to investigate the variables of storage conditions and time on the tissue-dissolving capacity of three different concentrations of sodium hypochlorite. Fresh frozen human umbilical cord was used as the tissue sample for this experiment. Tissue samples were dissolved at time intervals ranging from 1 day to 10 wk in 5.25%, 2.62%, and 1.0% solutions of sodium hypochlorite. The tissue-dissolving ability of 5.25% sodium hypochlorite remains stable for at least 10 wk. The tissue-dissolving ability of 2.62% and 1.0% sodium hypochlorite remains relatively stable for 1 wk after mixing, then exhibits a significant decrease in tissue-dissolving ability at 2 wk and beyond.

Kataia, M. A., R. E. Seif, et al. (1995). "Dentin wall adaptation of multiphase versus temperature thermoplasticized gutta-percha. A scanning electron microscopic study." Egypt Dent J **41**(2): 1129-36.

An in-vitro study was designed to compare dentin wall adaptation of Multiphase gutta-percha root canal obturation technique versus high temperature thermoplasticized gutta-percha (Obtura) in the presence and absence of smear layer. Forty single rooted teeth with straight canals were used. After decapitation roots were divided into two equal groups. Group (I) received final irrigation with EDTA and Sodium hypochlorite (NaOCI) to remove the smear layer, while roots in Group (II) were irrigated with NaOCI alone. Each group was then subdivided into two subgroups to represent the two filling techniques. Teeth were sectioned longitudinally and viewed under scanning electron microscope. Multiphase gutta-percha showed excellent adaptation to canal wall, specially in the absence of smear layer and displayed a homogeneous mass with little amount of voids than the Obtura system.

Piskin, B. and M. Turkun (1995). "Stability of various sodium hypochlorite solutions." Journal of Endodontics **21**(5): 253-5.

Although the manufacturers use at least a 2-yr expiration date for sealed undiluted NaOCl solutions, chemical stability of NaOCl may be adversely affected by many factors. The purpose of this study was to investigate the effects of storage temperature, concentration, and time on the stability on three different brands of commercial household bleaching agents as a source of NaOCl, and to compare the stability of these brands. All solutions showed degradation versus time; however, this degradation occurred very slowly except for the group of solutions containing 5% available chlorine stored at 24 degrees C. Solutions containing 0.5% available chlorine stored at 4 degrees C and 24 degrees C and 5% solutions stored at 4 degrees C showed satisfactory stability at 200 days. No significant difference was found among three brands in respect to their chemical stability.

Raphael, D., T. A. Wong, et al. (1981). "The effect of temperature on the bactericidal efficiency of sodium hypochlorite." Journal of Endodontics **8**(7): 330-4.