# Attitudes and communicative factors related to oral health and periodontal treatment

Jane Stenman

Department of Periodontology

Institute of Odontology

Sahlgrenska Academy

UNIVERSITY OF GOTHENBURG

2012

*Det händer men sällan*
*att en av oss verkligen ser den andre:*

*ett ögonblick visar sig en människa*
*som på ett fotografi men klarare*
*och i bakgrunden*
*någonting som är större än hans skugga*

Tomas Tranströmer: Galleriet, Ur Sanningsbarriären,
1978, Dikter och prosa 1954-2004

*With love to*

**René,**

*Caroline, Andreas, Christopher, Theodore, Isabella, Niklas, Fanny and Anton*

# CONTENTS

Appendix

*Study I*

*Study II*

*Study III*

*Study IV*

# Abstract

**Attitudes and communicative factors related to oral health and periodontal treatment**

The most important factor in the prevention and treatment of periodontal disease is the individual's standard of daily self-performed oral hygiene. Consequently, a major task in periodontal treatment is to motivate the patient to efficient oral hygiene behaviour. Attitudes towards oral health issues, communicative factors and interpersonal relationships are suggested as important factors in this respect. The overall aim of this thesis was to study the significance of such factors in the prevention and treatment of periodontal disease.

In Study I, attitudes towards oral health and experiences of periodontal treatment were explored through individual in-depth interviews with patients referred to a specialist clinic for periodontal treatment. In Study II, a partly new questionnaire, The Dental Hygienist Beliefs Survey (DHBS), was evaluated and tested among different patient groups and students. The questionnaire assesses patient confidence in the interaction with the dental hygienist. In Study III, dental hygienists views on communicative issues and interpersonal processes of importance in the prevention and treatment of periodontal disease were explored through individual in-depth interviews. The study sample consisted of dental hygienists working at general and specialist dental clinics. The constant comparative method for Grounded Theory was the qualitative method chosen for the data collection and analysis in Study I and III. Motivational Interviewing (MI) is a client-centred communicative method that can initiate beneficial behavioural change and improve the outcome when added to conventional treatment methods. Hence, Study IV was designed as a randomised controlled trial in order to evaluate the potential additive effect of a single session of MI on self-performed periodontal infection control. The study sample consisted of patients referred to a specialist clinic for periodontal treatment. The primary outcome variable was reduction in gingival bleeding.

The results showed that patients in treatment for chronic periodontitis experienced feelings of vulnerability. The communication with the specialist team was of the utmost important to gain insight into and an understanding of the severity of the disease condition. This understanding and the knowledge gained about the ways to achieve oral health and prevent further disease progression increased the patients' feeling of control of the situation (Study I). The DHBS was found to be a valid and reliable scale to assess patient-specific attitudes to dental hygienists. Moreover, negative dental hygienist beliefs were associated with dental anxiety (Study II). In-depth interviews with dental hygienists (DH) highlighted the importance of building a trustful relationship with the patient, feeling secure in one's professional role as a DH and, last but not least, receiving support from colleagues and the clinical manager was essential in order to be successful in the prevention and treatment of periodontal diseases (Study III). A single freestanding MI session as a prelude to conventional educational intervention and non-surgical periodontal treatment had no significant additive effect on the individual's standard of self-performed periodontal infection control in a short-term perspective (Study IV).

In conclusion, the results emphasise that communicative factors and interpersonal processes are important issues in dental treatment in order to get the patient to understand the disease condition, acquire knowledge about ways to achieve oral health, prevent disease progression, decrease anxiety and increase the patient's feelings of control of the oral health situation.

Key words: Chronic periodontitis, communication, dental hygienist, dental hygienist beliefs survey, dental hygienist-patient relationship, dental anxiety, grounded theory, interviews, motivational interview, oral health, oral hygiene behaviour, periodontal infection control.

# Preface

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals (I-IV):

I.     Stenman J, Hallberg U, Wennström JL & Abrahamsson KH (2009). Patients' attitudes towards oral health and experiences of periodontal treatment: A qualitative interview study. *Oral Health & Preventive Dentistry 7, 393-401.*

II.    Abrahamsson KH, Stenman J, Öhrn K & Hakeberg M (2007). Attitudes to dental hygienists: evaluation of the Dental Hygienist Beliefs Survey in a Swedish population of patients and students. *International Journal of Dental Hygiene 5, 95-102.*

III.   Stenman J, Wennström JL & Abrahamsson KH (2010). Dental hygienists' views on communicative factors and interpersonal processes in prevention and treatment of periodontal disease. *International Journal of Dental Hygiene 8, 213-218.*

IV.    Stenman J, Lundgren J, Wennström JL, Ericsson JS & Abrahamsson KH (2012). A single session of motivational interviewing as an additive means to improve adherence in periodontal infection control: A randomized controlled trial. *Journal of Clinical Periodontology;* doi: 10.1111/j.1600-051X.2012.01926.x

The papers are reprinted with kind permission of the publishers.

# Abbreviations

DAS        The Dental Anxiety Scale

DBS-R      The Dental Beliefs Survey

DH         Dental hygienist

DHBS       The Dental Hygienist Beliefs Survey

MI         Motivational Interviewing

MBI        Marginal Bleeding Index

PI         Plaque score

# Introduction

Chronic periodontitis is an infectious disease characterised by a plaque-induced inflammatory lesion in the soft tissues surrounding the teeth, leading to breakdown of the tooth-supporting structures. The disease affects approximately 40% of the adult population in Sweden and about 10-15% show severe forms of the disease (Hugoson et al., 2008; Papapanou & Lindhe, 2008). If left untreated, chronic periodontitis leads to deteriorating oral health status with a potential impact on the daily life and functioning of the individual (Needleman et al., 2004; Ng and Leung, 2006). The most important factor in both prevention and treatment of periodontal disease is the individual's standard of daily self-performed oral hygiene (Leung et al., 2006; Ramseier et al., 2008). Consequently, a key issue is to motivate the patient to efficient self-performed periodontal infection control (Philippot et al., 2005).

This thesis focuses on patient attitudes towards oral health and dental care, as well as on communicative factors and interpersonal relationships in relation to the prevention and treatment of periodontal disease.

## Oral and periodontal health or disease

Kay & Locker (1997) defined oral health as: "*A standard of health of the oral and related tissues which enables an individual to speak and socialise without active disease, discomfort or embarrassment and which contributes to general wellbeing.*" (p.8). In addition, in a report from a consensus conference held in Sweden in 2002 (Hugoson et al., 2003), oral health was defined as follows: "*Oral health is a part of general health and contributes to physical, psychological and social well-being with perceived and satisfactory oral functions in relation to the individual's requirements as well as the absence of disease.*" (p.140). Hence, based on these definitions, oral health is not only the absence of oral disease, but also an important component of general health and well-being.

Healthy periodontal conditions are achieved and maintained, mainly through efficient self-performed oral hygiene for infection control but also through a healthy life style, for example, avoidance of tobacco use (Ramseier et al., 2008). It has been suggested that patients' attitudes towards health issues and treatment regimens are related to the awareness and perceived severity of the disease (Ogden, 2000). With regard to patients' perception of periodontal health/disease, individuals are often unaware of their periodontal status and treatment needs. Airila-Månsson et al. (2007) showed that only 1.2% of patients diagnosed with periodontitis self-reported awareness of having periodontal disease. Symptoms reported by these subjects were mainly bleeding gums, gingival recession and sensitive teeth. This observation indicates that many individuals might very well consider their oral health as good despite having periodontitis of varying severity. In fact, a recent qualitative study by Karlsson et al. (2009) revealed that patients referred for periodontal treatment had a low degree of awareness of their periodontal conditions and treatment needs. Furthermore, common reactions among patients, after being diagnosed with and informed about chronic periodontitis, were shock and feelings of surrealism (Abrahamsson et al., 2008; Karlsson et al., 2009). Patients referred to a specialist clinic for periodontal treatment also expressed feelings of anger and disappointment towards previous caregivers for not having provided adequate information about periodontal conditions and treatment needs (Abrahamsson et al., 2008). Moreover, it has been reported that patients with periodontitis perceived that their oral disease had a negative impact on daily life and in interactions with other people (Needleman et al., 2004; Ng & Leung, 2006; Cunha-Cruz et al., 2007; Karlsson et al., 2009; Abrahamsson et al., 2008). Hence, the concept of periodontal health/disease is multifaceted, and it is obvious that the patients' perceptions of their oral health and how their oral disease may affect their general life and well-being is of importance when considering prevention and treatment of periodontal diseases.

# Health behaviour theory

What motivates people to different health-related behaviour is a complex process. The perceived severity of the disease, the time and complexity of the treatment, as well as the treatment alliance between the patient and the caregiver are factors suggested to be of importance for the motivation and willingness to adhere to treatment and health advice (Marks et al., 2006). With regard to the prevention and treatment of periodontal diseases there are several aspects to consider, related to the individual, the disease and the treatment.

From a behavioural science perspective, evidence suggests that health behaviour is governed by the individual's beliefs, expectations, incentives, confidence and goals (Bandura, 2004; Ogden, 2000; Marks et al., 2006). Moreover, behavioural models based on a social cognitive approach place the individual within a social context and the normative influences of others. Several models have been developed using social cognitive approaches in order to understand health behaviours and improve patient compliance in health care (Ogden, 2000; Marks et al., 2006). However, studies based on such theoretical health behaviour models in order to improve adherence to self-performed periodontal infection control are very limited (SBU, 2004; Rentz et al., 2007; Swedish National Board of Health and Welfare (Socialstyrelsen), 2011).

## Compliance and adherence

The terms compliance and adherence are often used interchangeably in the literature; however, there are some differences between these terms.

Compliance is defined as: *"The extent to which the patient's behaviour matches the prescriber's recommendation."* (Horne et al., 2005; p.12). Thus, the term has a somewhat negative implication, given the description of a "passive" patient following the clinician's/expert's order. Adherence, on the other hand, is defined as: *"The extent to which the patient's behaviour matches agreed recommendations from the prescriber."* (Horne et al.,

2005; p.12). Hence, Horne et al. (2005) suggested that the definition of "adherence" is relevant and useful if it follows a process that allows patients to influence the decision-making; i.e., the patient takes an active part in the decision-making process. The term "non-adherence" is noteworthy as it describes a process where a patient does not get the best treatment, which could be problematic, particularly in patients with chronic disease (Horne et al., 2005). There is a wide range of social and psychological factors related to non-adherence (Marks et al., 2006). However, regardless the reasons for the lack of "compliance" or the "non-adherence," the consequences for the patient's periodontal health are important (Godard et al., 2011). Factors associated with "poor compliance" have mainly been described as insufficient oral hygiene behaviour, such as the lack of efficient tooth-brushing and non-use of interdental cleaning aids (Ojima et al., 2005). A recent review concerning the psychology of patient compliance Umaki et al., (2012) discussed that "non-compliance" with periodontal maintenance cannot be explained by a single factor but may involve the individual's health beliefs, emotional intelligence, psychological stressors and personality traits. Greater knowledge and consideration of such factors may thus contribute to more successful behavioural approaches in oral health promotion programmes.

## Treatment alliance

As mentioned above, the communication and interpersonal relationship between the patient and the caregiver are suggested as crucial factors for the adherence to health advice and the treatment outcome (Ogden, 2000). More specifically, the treatment alliance has been described as a key determinant for treatment success. The treatment alliance does not only depend on the caregiver's empathic and communicative ability and the interpersonal relationship between the patient and caregiver, but also on the patient's contribution to reaching treatment goals (Elvins & Green, 2008). A recent review by Elvins & Green (2008) illustrated that the concept of a treatment alliance refers to a number of interpersonal processes that can be measured by numerous scales or questionnaires. However, there is no single scale or questionnaire that

comprises all issues within the broad treatment alliance concept (Elvins & Green, 2008).

The results of previous studies (Abrahamsson et al., 2008; Karlsson et al., 2009) reveal that patients referred to periodontal treatment generally have great confidence in dental the "medical/technical" skills of the professionals and believe that dentists and dental hygienists provide their patients with good care. Even so, the patients felt that they had little control over treatment decisions and treatment outcomes (Abrahamsson et al., 2008; Karlsson et al., 2009; Mårtensson et al., 2012). The perception of control versus lack of control in dentistry is closely related to the patients' attitudes to dental caregivers and to feelings of fear and anxiety in relation to dentistry (Abrahamsson et al., 2003, 2006). It was also shown that patient attitudes towards the dentist's communicative skills were of significant importance for the treatment outcome among fearful dental patients (Abrahamsson et al., 2003). Furthermore, patient satisfaction with the care provided seems to be closely related to the interpersonal relationship with the dental caregiver (Svensson et al., 2000; Collins & O'Cathain, 2003; Ståhlnacke et al., 2007). Hence, the communication and interpersonal relationship between the patient and the dental caregiver should also be considered in the treatment of periodontitis. Freeman (1999) argued that all available measures to access information about the patient must be used, as this will strengthen the treatment alliance and thus contribute to a successful treatment outcome.

## Oral health education interventions

A health education programme is claimed to be more beneficial to the patient if it is guided by a theory of health behaviour (Ogden, 2000; Marks et al., 2006). A systematic review by the Swedish Council on Health Technology Assessment (SBU, 2004) elucidated the need for further knowledge about psychosocial interactions related to the prevention and treatment of chronic periodontitis. This is in line with a Cochrane review by Renz et al., (2007), who claimed that future research should adopt

psychological models or theories to improve oral health-related behaviour. The reason behind this proposal is that traditional oral health education interventions have been found to be of limited value for the long-term adherence to oral hygiene regimens (Renz et al., 2007). Moreover, the criticism against traditional health education programmes has been that programmes based on a biomedical approach are rather ineffective, and instead of a "passive patient", one should aim for a more non-judgemental and supportive approach in oral health education (Yevlahova & Satur, 2009). The results of recent studies (Philippot et al., 2005; Jönsson et al., 2009, 2010) suggest that individualised and patient-centred educational interventions, based on health behaviour theories, are preferable to conventional educational interventions in order to improve the patient's adherence to self-performed periodontal infection control.

Educational intervention programmes directed to patients in treatment for chronic periodontitis have traditionally been given "step by step," including (i) detailed information through pamphlets about signs and symptoms of the disease and their relationship to the presence of bacterial biofilms and the patients' periodontal status, (ii) demonstration of the presence of signs, symptoms and locations of the disease in the patient's mouth, (iii) detailed information about the importance of efficient daily oral hygiene followed by oral hygiene instructions, and (iv) the use of disclosing solution for plaque staining as a pedagogical tool to demonstrate where the bacterial plaque is located. Adherence with the information provided and the patient's oral hygiene status are then monitored at subsequent treatment sessions (Rylander & Lindhe, 1997). Yet, motivating patients to change their oral health behaviour is indeed a challenge for dental professionals and a complex issue, which has led to the introduction of Motivational Interviewing (MI) in dentistry (Skaret et al., 2003; Weinstein et al., 2004, 2006; Harrison et al., 2007; Almomani et al., 2009; Jönsson et al., 2009, 2010; Freudenthal & Bowen, 2010; Godard et al., 2011; Ismail et al., 2011).

MI is a client-/patient-centred therapeutic method in which the therapist has an important role in increasing the client's readiness for behaviour change and reinforcing his/her commitment to change (Miller & Rollnick, 2002). MI was originally developed for use in the field of drug abuse but has shown to be applicable to initiate beneficial health behaviour change within several other areas (Ruback et al., 2005; Hettema et al., 2005). Several studies have demonstrated that MI can initiate a change in behaviour after only a few freestanding interventions (1-2 MI sessions) and that the change in behaviour seems to last over time (Miller & Rollnick, 1991; Miller, 1996). MI also appears to improve outcomes when added to other treatment approaches or conventional treatment methods (Hettema et al., 2005). However, MI is a method that requires considerable skill and its efficacy varies greatly across providers, populations, target problems and settings (Hettema et al., 2005).

Relevant studies using MI in dental care settings are summarised in Table 1. Commonly, MI was used in combination with conventional oral health educational intervention and/or another intervention, such as (i) telephone interviews, (ii) response cards, (iii) questionnaires, (iv) pamphlets, and (v) DVDs and videos (Skaret et al., 2003; Almomani et al., 2009; Jönsson et al., 2009, 2010; Godard et al., 2011; Ismail et al., 2011). In addition, some of the studies used one or several follow-up telephone calls (Skaret et al., 2003; Weinstein et al., 2004, 2006; Harrison et al., 2007; Freudenthal & Bowen, 2010). Weinstein et al. (2004) used MI as an additive means to traditional health education directed to parents in order to prevent caries among their children. The results of the two-year study showed that the MI approach was superior to traditional health education alone to prevent the development of caries. Almomani et al. (2009) reported a positive effect of a brief MI session, as a prelude to oral health education, on short-term oral hygiene behaviour in a group with severe mental illness. Jönsson et al. (2009, 2010) used techniques from the MI method as an integrated part of an individually tailored oral health education programme directed to patients receiving periodontal treatment at a specialist clinic. The intervention comprised seven separate components for tailoring the programme to each individual's needs; analysis

of knowledge, expectations and motivation, analysis of oral hygiene behaviour, practice of manual dexterity for oral hygiene aids, individual goals for oral hygiene behaviour, continuous self-monitoring, generalization of behaviour and, finally, maintenance of oral hygiene behaviour and prevention of relapse. The results revealed that the individually tailored education programme, with counselling inspired by MI, was efficacious in improving medium-term (one-year) adherence to self-performed periodontal infection control and was preferable to traditional oral health educational intervention (Jönsson et al., 2009, 2010). Furthermore, Godard et al. (2011) used MI in addition to consultation and traditional oral health education. The results were promising, with greater oral hygiene improvement, as assessed by plaque index, in a short-term (one month) perspective. Thus, there are different approaches by which MI may be used in oral health communication. Taken together, the findings presented in Table 1 are unanimous concerning MI as a promising communicative method, regardless of the approach and focus of the oral health behaviour intervention.

Table 1. Overview of Motivational Interviewing (MI) studies in dental care settings.

| Authors | Type of study | Subjects/Time interval | Aim | Methods | Findings | Authors conclusions |
|---|---|---|---|---|---|---|
| Skaret et al. 2003 | Pilot study | 50 subjects, 18 years of age, who had one or more missed appointments during the previous four years. Time for follow-up not reported. | To develop and test the methodology of an intervention and to measure the respondents' beliefs regarding the intervention. | Group comparisons design to compare three experimental and one control group. Baseline questionnaire, followed by a brief telephone call and post-intervention questionnaire in all groups. Group I: Response cards (RC). Group II: Motivational Interview. Brief, structured telephone interview, based on MI approach. Including empirically based strategies for reducing anxiety/–increasing perception of control, focusing on the impact of dental avoidance. Group III: Combined treatment. Both RC and the MI structured telephone call. Group IV: Controls. Conventional health education by phone (i.e., visiting the dentist and brushing regularly) | Subjects in the experimental groups had significantly higher credibility scores than the control group ($p<0.05$) for to the statement "How much easier do you perceive dental treatment to be for you, based on this program". They had also more positive beliefs to the statement "I think the interviewer liked to talk to me" ($p<0.05$) than the control group. Moreover, while differences were small, MI techniques utilized in a brief telephone call may enhance the above effect. | A questionnaire sent to non-attending adolescents followed by a brief telephone call based on MI appears to be a credible intervention for adolescents avoiding dental care. |
| Weinstein et al. 2004 | RCT-study with a comparison between two interventions; one MI approach and one traditional health education approach. | Mothers and 240 healthy infants aged six to 18 months. One-year findings | To compare two approaches to the prevention of caries in a population of children at high risk of developing the disease: an MI approach vs. a traditional health education approach. | Group comparisons design. Both groups: pamphlet and video. Experimental group: *one MI session and six follow-up telephone calls* during the preparation for change and while change was occurring. Finally two postcards reminders. | After one year, children in the MI group had .71 new caries lesions while those in the control group had 1.91(SD=4.8) new caries lesions. | MI is a promising approach that should receive further attention. |
| Weinstein et al. 2006 | As described above. | As described above. Two-year findings | As described above. | As described above. No intervention in year two. | After two years, children in the MI group exhibited significant less new caries (decayed or filled surfaces) than those in the control group (that is, a protective effect of MI) (odds ratio = 0.35; 95% CI = 0.15 to 0.83) | MI is a promising approach that warrants further attention in a variety of dental contexts. |
| Harrison et al. 2007 | As described above. | As described above. Two-year findings | As described above. Further to use Poisson regression, a time-to-event statistical methodology, to increase efficiency of the data analysis. | As described above. No intervention in year two. | Poisson regression supported a protective effect of MI (hazard ratio [HR]=0.54; 95 % CI=0.35-0.84); that is, the MI group had about 46 % lower rate of dmfs at 2 years than the control children. | A MI-style intervention shows promise to promote preventive behaviour in mothers of young children at high risk of caries. |

| Authors | Type of study | Subjects / Time interval | Aim | Methods | Findings | Authors conclusions |
|---|---|---|---|---|---|---|
| Almomani et al. 2009 | Comparison between two interventions. Subjects were randomly assigned to MI group or control group. | 60 adults with severe mental illness were recruited from a community programme. 8 weeks | To investigate whether a brief MI session before oral health education would enhance the educational effect. | Group comparisons design. Both groups: oral health education. Experimental group: received *a brief MI session before oral health education.* -Plaque index -15-item Oral Health Knowledge questionnaire (the Treatment Self-Regulation Questionnaire, TSRQ) | Repeated-measures ANOVA showed improvement (<0.05) in plaque, internalised motivation, and oral health knowledge over time for both groups; however, individuals receiving MI improved significantly more when compared with those receiving oral health education alone. | It was suggested that MI is effective for enhancing short-term oral health behaviour change for people with severe mental illness and may be useful for the general population. |
| Jönsson et al. 2009 | Two experimental single-case studies with multiple-baseline design. | A female and a male patient, referred to a specialist clinic for periodontal treatment. Two-year findings | To describe and evaluate an individually tailored treatment programme based on behavioural medicine approach for oral hygiene self-care in patients with periodontitis. | Two experimental single-case studies with multiple baseline over two different self-administered oral hygiene measures; (i) tooth brushing and (ii) interdental cleaning, were conducted. The intervention phase was separated into two sections, analysis and applied skills and generalisation. *The counselling was inspired by and structured in accordance with MI.* | Both participants reached the pre-decided criteria for clinical significance in reducing plaque and bleeding on probing. Reductions in periodontal probing depth were achieved as well. The positive results remained stable throughout the two-year study period. | It was suggested that the application of this educational model could be used as a method for tailoring interventions targeted at oral hygiene for patients with periodontal conditions. |
| Jönsson et al. 2009 | RCT-study with a comparison between two different active treatments. | 113 subjects (60 females and 53 males), referred to a specialist clinic for periodontal treatment. One-year findings | To evaluate the effectiveness of an individually tailored treatment programme for oral hygiene self-care in patients with chronic periodontitis compared with the standard treatment. | Group comparisons design. The experimental group received an individually tailored oral health education programme based on cognitive behavioural principles. The central theme of the programme was tailoring the treatment to each individual's problem, capacity and goals. The programme comprised of seven separate components with different tactics for tailoring the programme to each individual regarding oral health and dental hygiene habits. *To create a "dynamic dialogue," MI methods were included.* | The experimental group improved both GI and PlI more than the control group. The subjects in the experimental group reported a higher frequency of daily inter-dental cleaning and were more certain that they could maintain the attained level of behaviour change. | The individually tailored oral health education programme was efficacious in improving long-term adherence to oral hygiene in periodontal treatment. The largest difference was for interproximal surfaces. |
| Jönsson et al. 2010 | As described above. | As described above. One-year findings | To evaluate an Individually Tailored Oral Health Education Programme (ITOHEP) on periodontal health compared with a standard oral health programme (ST). A further aim was to evaluate whether both interventions had a clinic-ally significant effect on non-surgical periodontal treatment at 12-month follow up. | Group comparisons design. As described above | The ITOHEP group had lower BoP scores 12 month post-treatment (95% CI: 5-15, $p<0.001$) than the ST group. No difference between the two groups was observed for "pocket closure" and reduction in periodontal pocket depth. Lower PlI scores at baseline and ITOHEP intervention gave higher odds of treatment success. | ITOHEP intervention in combination with scaling is preferable to the ST programme in non-surgical periodontal treatment. |

| Authors | Type of study | Subjects/Time interval | Aim | Methods | Findings | Authors conclusions |
|---|---|---|---|---|---|---|
| Fredenthal & Bowen, 2010 | Comparison between two interventions. Subjects were randomly assigned to MI group or control group. | 72 mothers<br><br>Four weeks | To study if an MI approach to oral health education promoted positive changes in early childhood caries (ECC) risk-related behaviours of mothers enrolled in a Woman, Infants and Children programme (WIC). | Group comparisons design. All subjects completed pre-test and post-test questionnaires four weeks apart. Mothers in the treatment group (n=40) experienced a *counselling-type session (MI) and follow-up telephone calls to* promote positive oral health behaviour. | No significant change was found in the four constructs measured: valuing dental health, permissiveness, convenience and change difficulty, and openness to health information. Statistically significant positive changes were found in the treatment group only in the number of times the children's teeth were cleaned or brushed ($p$=0.001) and the use of shared eating utensils ($p$=0.035). Other cariogenic feeding practices and use of sweets to reward or modify behaviour were not significantly affected ($p$<0.05) | In this group of WIC mothers, MI appeared to have a modest impact on some high-risk parental behaviour that contributes to ECC. This approach warrants further investigation to assess the impact of an extended intervention programme, parents from diverse populations and the feasibility of the use of peer counsellors in the public health setting. |
| Godard et al. 2011 | RCT-study with a comparison between two interventions. Experimental group with MI in addition to standard treatment programme or a control group with standard treatment programme alone. | 51 subjects suffering from periodontitis<br><br>1 month | To assess whether an MI addressing the five dimensions of Leventhal's theory performed better than conventional basic instruction on improving compliance with plaque control among patients with periodontitis. | Group comparisons design. The experimental group received an *MI guided by Leventhal's theory. A questionnaire based on the principles of MI was used,* while addressing the five dimensions of Leventhal's theory. The MI was approx. 15-20 min. long, about the same time as the control group consultation. Oral hygiene information and instruction were given to the patient during the MI. | Patients in the MI group had higher oral hygiene improvement 1 month post-treatment. MI resulted in greater satisfaction scores compared with those of patients in the control group. | MI is a promising approach and can be useful for counselling-related periodontal disorders. |
| Ismail et al. 2011 | A longitudinal randomised study. | 1021 children and their caregivers<br><br>Approx. 2.5 year | To evaluate the effectiveness of tailored educational intervention on oral health behaviour and new untreated caries lesions in low-income African-American children in Detroit, Michigan. | Group comparisons design. *The subjects in the intervention group received MI and a DVD.* Subjects in the control group received DVD only. In the presence of the interviewer, caregivers in both groups viewed a 15-minute educational video specifically designed for the project and emphasizing the importance of good oral health. After the video the subjects in the MI group had an MI discussion with personal goals.<br><br>Within six months of the MI, attempts were made to contact the caregivers for a follow-up. | After the six-month follow-up, caregivers receiving MI were more likely to report checking the child for "precavities" and making sure that the child brushed at bedtime. Final outcomes two years later showed that the caregivers receiving the MI were still more likely to report making sure that the child brushed at bedtime, yet were not more likely to make sure that the child brushed twice per day. Despite differences in one of the reported behaviours, children whose caregivers received the MI did not have fewer new untreated lesions at the final evaluation. | It was found that a single MI may change some reported oral health behaviours, but failed to reduce the number of untreated caries lesions. |

S.D, standard deviation; CI, confidence interval

# Rationale and intentions of the present thesis

From a professional point of view, a main goal in the prevention and treatment of periodontal disease is to motivate the patient to efficient oral hygiene and periodontal infection control. However, what motivates people to such desirable health behaviour efforts differs and the decision about behaviour change always resides with the individual patient. Attitudes towards oral health issues, as well as the communication and interpersonal relationship between the patient and the caregiver are suggested as crucial factors for the adherence to health advice and treatment regimens. In this context, it is important to involve the perspectives of both the patient and the professionals. There is still limited knowledge about psychosocial interactions in relation to the prevention and treatment of periodontal disease. Studies with such behavioural approaches are thus warranted (SBU, 2004; Socialstyrelsen, 2011) and may contribute important knowledge to the development of efficient periodontal health promoting programmes.

# Aims

The overall aim of the present thesis was to gain further knowledge regarding communicative factors and interpersonal processes in the prevention and treatment of periodontal disease.

The specific aims were:

- to explore patient attitudes to oral health and experiences of periodontal treatment *(Study I)*.

- to evaluate and test the psychometric properties of a questionnaire developed to assess patients specific attitudes to DHs; i.e., the Dental Hygienist Beliefs Survey (DHBS), in a Swedish sample of different patient groups and students *(Study II)*.

- to explore views of DHs on communicative issues and interpersonal processes of importance in the prevention and treatment of periodontal disease *(Study III)*.

- to evaluate the potential additive effect of a single session of Motivational Interviewing (MI) on self-performed periodontal infection control in periodontal patients *(Study IV)*.

# Material and Methods

## Ethical considerations

The ethical board at the University of Gothenburg (Study I-IV) and Dalarna University (Study II) reviewed and approved the study protocols. Verbal and written information regarding the aims and procedures was given to the subjects in all studies. The requirements concerning informed consent and confidentiality were met.

## Study designs

Both quantitative and qualitative methods were used in this thesis. An explorative design was used in Study I and III with in-depth interviews. In Study II, a questionnaire, the Dental Hygienist Beliefs Survey (DHBS), was tested and evaluated. Study IV was a randomised controlled clinical trial. Table 2 shows the design, sample and data collection methods in the various studies.

Table 2. Design, sample and data collection methods in Studies I-IV

| Study | Design | Sample | Data collection method |
|---|---|---|---|
| I | Explorative | 16 patients | In-depth interviews |
| II | Cross-sectional Descriptive | 710 students and adult patients | Questionnaire |
| III | Explorative | 17 dental hygienists | In-depth interviews |
| IV | Randomised controlled trial | 44 patients referred to a specialist clinic for periodontics | Oral examinations, clinical assessment |

# Subject samples

## *Study I*

The study group consisted of 16 patients (7 males) aged 50-68 years (mean 58.6 years), strategically recruited on a consecutive basis among patient referred to a specialist clinic in Gothenburg, Sweden, for treatment of chronic periodontitis. Patients were strategically selected to represent males and females, different levels of education and occupational status. The subjects had been subjected to in-depth interviews before the initiation of treatment (Abrahamsson et al., 2008). Repeated in-depth interviews with the patients were performed after the completion of the cause-related treatment phase delivered by dental hygienists. The time interval between the interviews, which were performed by JS and UH, was approximately 6 months.

## *Study II*

The study included 710 adults; 240 students (psychology, sociology, technology, health and caring sciences), 200 general dental care patients (5 clinics in Gothenburg and Falun), 170 patients referred for periodontal treatment (2 clinics in Gothenburg and Falun), and an additional 100 patients on a waiting list for treatment at a specialised dental fear clinic in Gothenburg, Sweden.

## *Study III*

Study III involved 17 DHs (one man) aged 29-66 years (mean 48.6 years) working at general and specialist clinics at the Public Dental Service, Västra Götaland, Sweden. The DHs were strategically selected to represent different ages, professional experience and education level. The interviews were performed by the author (JS) at the clinics where the DHs worked.

*Study IV*

The study sample included 44 individuals (13 men) with chronic periodontitis; mean age 50.4 (SD 10.6) years. The study was designed as a randomised, evaluator-blinded, controlled clinical trial involving patients referred to a specialist clinic in Gothenburg, Sweden, for treatment of chronic periodontitis. A power calculation was performed to estimate the sample size (G*Power 3; Faul et al., 2007). Based on data from previous intervention studies of an expected final full-mouth marginal bleeding index (MBI; primary efficacy variable) of 30 % with a standard deviation of 10 %, a difference of 10 percentage units in MBI between test and control groups was considered as clinically significant. With the alpha error set to 0.05, 17 subjects per group were required for a study power of 80 %. Figure 1 illustrates the flow chart of Study IV.
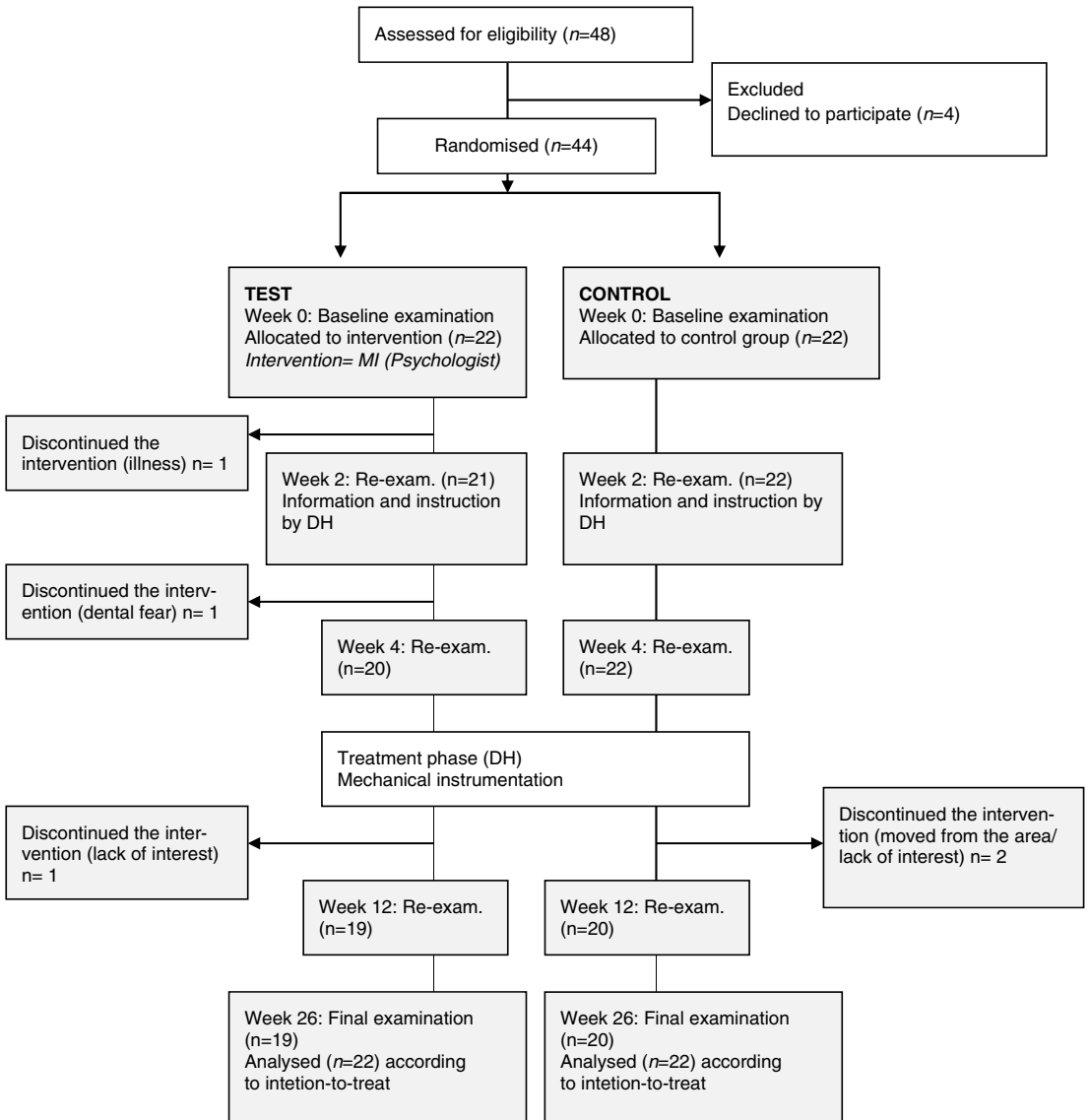
Fig. 1. Study protocol (Study IV)

# Methods

## *In-depth interviews*

The qualitative method used for collecting and analysing data in Study I and III was the constant comparative method for Grounded Theory (GT), originally described by Glaser and Strauss (1967) and further developed by Strauss and Corbin (1990; 1998) and Charmaz (2000, 2006). Open ended, tape-recorded interviews were conducted. An interview guide with different themes was used. Each interview was transcribed verbatim and analysed before the next interview took place in accordance with the principles of GT. The analytic interpretations of the interview data directed the focus of further data collection; i.e., theoretical sampling. Data collection/analysis was terminated when the new data failed to bring anything vital into the analysis model; i.e., saturation had been reached within the study group. The objective of the GT method is to gain an interpretative understanding of the subjects meaning of their reality (Charmaz, 2006).

## *Questionnaires*

In Study II, a partly new questionnaire was used, the Dental Hygienist Beliefs Survey (DHBS). The questionnaire assesses patients' confidence in the interaction with the dental hygienists, not the treatment. The DHBS was based on the Swedish version of the Dental Beliefs Survey (DBS-R) (Abrahamsson et al., 2006) and consisted of 28 items, scored from 1 (do not agree) to 5 (highly agree), giving a total score range between 28 (not negative) and 140 (highly negative). The questionnaire was distributed together with the DBS-R concerning specific attitudes to dentists and the Corah Dental Anxiety Scale (DAS) (Corah et al., 1978; Berggren & Carlsson, 1985).

In Study IV, all patients rated their motivation to engage in periodontal treatment on a 100mm visual analogue scale (VAS). The scale was marked with the word "not at all"

at its left and "fully" at its right end. The distance from the left point to the mark made by the patient was measured and expressed as a percentage.

*Intervention*

In Study IV, a single motivational interviewing (MI) session was conducted in accordance with the principles of MI by a clinical psychologist with knowledge and experience of the specific method (Miller & Rollnick, 1991, 2002). On average, the MI-intervention lasted 44 minutes and was performed in a quiet room located outside the periodontal clinic. The primary focus for the MI was the patients' views of their current oral health status and their view on how oral health status relates to their past, present and future behaviour, as well as to other factors that the patient considered important. Specific strategies for behavioural change in relation to oral health and periodontal treatment were explored and reinforced. Throughout the interview, the patient was addressed as an active person who can seek information and plan behaviour in order to reach a self-defined desired outcome. All MI sessions were audiotaped in order to supervise the therapist with regard to the methodological quality. Eleven interviews (50 %) were randomly selected and coded by independent reviewers using the Motivational Interviewing Treatment Integrity (MITI 3.0) scale (Moyers et al., 2007).

Conventional educational intervention and non-surgical periodontal treatment in Study IV were performed by four experienced dental hygienists (DHs) and in accordance with standard routines at the specialist clinic. The first treatment session comprised: (i) information and discussion regarding the patient's periodontal status and the treatment; (ii) structured information regarding periodontal diseases; (iii) information about the importance of patient's own efforts regarding daily oral hygiene measures for a successful treatment outcome and (iv) oral hygiene instruction following plaque staining with a disclosing solution.

Subsequent treatment sessions comprised: (i) evaluation of oral hygiene performance; (ii) further information, re-instruction and training in the tooth cleaning techniques, if required; (iii) supra/subgingival mechanical debridement (one jaw quadrant per session) and (iv) polishing of all teeth using a rubber cup and RDA 170 paste (Prophy Paste. CCS®). Each treatment session lasted for about one hour.

## *Clinical assessments*

In Study IV, the patients were examined with regard to marginal gingival bleeding (MBI) and plaque scores (PI) at baseline (before any interventions) and at various time intervals during the study period (Fig. 1). The assessments were made at all single-rooted teeth and at six sites per tooth. MBI was assessed as present (1) or absent (0) following superficial probing of the gingival sulcus. PI was assessed as present (1) or absent (0) following staining of the teeth with a disclosing solution. A dental hygienist, unaware of study group assignments and not involved in the treatment of the patients, performed all clinical assessments during the study. Training and calibration were conducted prior to the start of the study to ensure reproducibility of measurements (MBI and plaque score).

# Data handling and analysis

## *Interview data*

The analysis of the interview data (Study I and III) was performed in close collaboration between the authors representing different scientific disciplines (odontology, sociology, psychology and pedagogics). The emerging categories were discussed and the final model of the results was made in agreement between the authors. The steps in the analysis were the following:

(i)     Line-by-line coding of the transcribed interview, leading to the identification of substantive codes/key words reflecting the essence of the data. The substantive codes were thus labelled with the informants' own words;

(ii)    Substantive codes with similar content were then summarised into categories. These categories were given a more abstract label than the substantive codes;

(iii)   In the subsequent axial coding process, during which connections and similarities between categories were explored, each category was further elaborated and saturated.

(iv)    The final step was the selective coding where a core category was identified. This core category was central in the data and related to the subcategories.

## Questionnaire data

The analysis of the questionnaire data (Study II) included descriptive statistics, $\chi^2$ - analysis, and one-way ANOVA, followed by *post hoc* Tukey test for comparisons between the study groups regarding gender, age, DAS and DHBS. Spearman's rank order correlation coefficients were calculated for the relationship between gender, age, DAS, DBS-R and DHBS. Chronbach's alpha reliability coefficients were calculated to test the internal consistency of the DHBS. Multiple linear regression analysis was used to explore the predictive values for dental fear (DAS) of the separate items of the DHBS, as well as gender and age.

## Clinical data

In Study IV, the clinical efficacy variables were MBI (primary efficacy variable) and plaque score (secondary efficacy variable). The scores were expressed in % of positive sites, and mean values and standard deviations (SD) were calculated for the test and control groups at the various examination intervals. Changes in MBI and plaque scores during the study period were also determined. The analysis of the data was performed

according to the intention-to-treat principle including all randomised patients regardless of any withdrawal during the treatment phase; i.e., the last assessment made was considered valid throughout the study period for patients who were lost to follow-up.

Differences in proportions of individuals with regard to individual characteristics were statistically tested by the use of $x^{2}$ analysis. Student's *t*-test was used to analyse differences in MBI and plaque scores between the two study groups. Correlation analysis (Spearman's *rho*) was used with regard to individual characteristics in relation to clinical assessments. Multiple logistic regression (forward stepwise) analysis was used to explore associations between individual characteristics and variables identified in the preceding analyses as significantly correlated with the six-month clinical outcome variables. All data analyses in Studies II and IV were processed by the use of the Statistical Products Service Solutions (SPSS, version 19.0) and with a *p* value of 0.05 as the level of statistical significance.

# Results

## Patients' attitudes towards oral health and experiences of periodontal treatment

In the analytical process, a core category reflecting the central theme in the data was identified as 'understanding the seriousness of the disease condition' (Study I). Furthermore, four categories were identified and labelled as (i) 'the need to be treated respectfully', (ii) 'to gain insight', (iii) 'frustration about the financial cost for the treatment' and (iv) 'feelings of control over the situation' (Fig. 2). These categories illustrated how the patients during treatment became aware of their chronic disease and potential consequences. During the treatment they assumed responsibility for their situation and understood the importance of their own efforts with regard to self-care for a successful treatment outcome. A marked difference from the previous experiences of dental care was the detailed information they received about periodontal disease and the means to accomplish oral health and prevent further disease development. This awareness increased the patients' feeling of control of the situation. However, they expressed feelings of both confidence and anxiety for the future with respect to their chronic disease. Hence, the generated core category and its related categories described a psychosocial process related to the periodontal treatment.

**UNDERSTANDING THE SERIOUSNESS OF THE DISEASE CONDITION**

The need to be treated respectfully → To gain insight → Frustration about the financial cost for treatment → Feelings of control over the situation
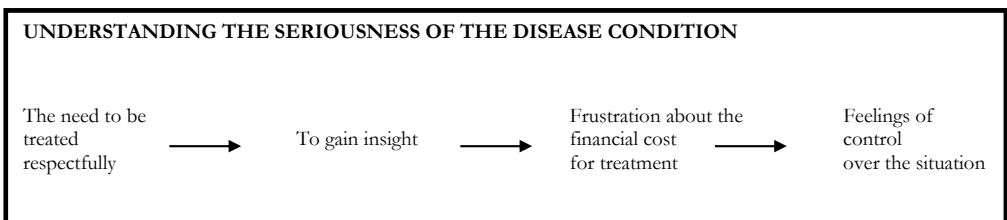
Figure 2. A conceptual model illuminating the process where the patients during treatment became aware of their chronic disease and the potential consequences, i.e., "understanding the seriousness of the disease condition."

# Attitudes to dental hygienists assessed by the Dental Hygienist Beliefs Survey (DHBS)

The results of Study II revealed that the partly new questionnaire DHBS was a valid and reliable scale to use in order to assess patients' specific attitudes to DH. The results verified that the DHBS discriminates well between dentally fearful and non-fearful study groups. The α reliabilities amongst the DHBS scores were generally high, with a total Cronbach's α of 0.96-0.98 in all the groups. Correlation analysis showed that the DHBS sum of scores was positively correlated to the questionnaires DBS-R (*rho* = 0.82, $p$ <0.001) and DAS (Dental Anxiety Scale) (*rho* = 0.54, $p$ <0.001), and negatively correlated to age (*rho* = -0.21, $p$ <0.001). With regard to gender, women showed higher DHBS sum scores than men (*rho* = -0.12, $p$ <0.05).

As shown in Table 3, a significant difference ($p$ <0.001) regarding mean DHBS values was observed between the dental fear patients and all the other subject groups. The highest mean item scores in all the groups were found in item 23; i.e., "once I am in the dental hygienist's chair I feel helpless (that things are out of my control)." There was also a statistically significant difference in DAS scores between dental fear patients and the other groups ($p$ <0.001). The linear regression analysis with regard to dental fear showed that gender (i.e., being a woman) ($t$ = -2.79, $p$ <0.01) and the DHBS item 23 ($t$ = 7.69, $p$ <0.001), item 16 ($t$ = 6.23, $p$ <0.001) and item 28 ($t$ = 5.04, $p$ <0.001) significantly predicted dental fear. Items 23, 16 and 28 were related to feelings of helplessness, worries/fears of not being taken seriously and fear about 'bad news'.

Table 3. Description of the study group of students, general dental patients, periodontal patients and dental fear patients with regard to gender, age and mean sum of scores (SD) of DHBS and DAS

| Subjects (*n*=394) | Students | General patients | Periodontal patients | Fear patients | $\chi^2/F$ | $p$ value |
|---|---|---|---|---|---|---|
| | (*n*=130) | (*n*=144) | (*n*=90) | (*n*=30) | | |
| Women (n=260) | 91 | 91 | 55 | 23 | $\chi^2$=3.9 | >0.05 |
| Men (n=134) | 39 | 53 | 35 | 7 | | |
| Age, mean (SD) | 29.8 (8.7) | 53.2 (14.6) | 56.8 (11.1) | 41.5 (13.3) | $F$=120.1 | <0.001 |
| Scale | | | | | | |
| DHBS, mean sum score (SD) | 41.6 (16.3) | 37.3 (14.6) | 41.2 (17.8) | 84.3 (28.7) | $F$=62.7 | <0.001 |
| DAS, mean sum score (SD) | 8.4 (3.8) | 8.1 (3.6) | 8.8 (4.7) | 17.8 (2.8) | $F$=53.7 | <0.001 |
| DHBS, mean item score (SD) | 1.5 (0.6) | 1.3 (0.5) | 1.5 (0.6) | 3.0 (1.0) | | |

# Dental hygienists views on communication and interpersonal processes related to the prevention and treatment of periodontal disease

In Study III, the analysis process identified a core category reflecting the central theme in the data that was identified as 'to be successful in information and oral health education and managing desirable behavioural changes' (Figure 3). The core category was related to four main categories labelled as (i) 'to establish a trustful relationship with the patient', (ii) 'to present information about the oral health status and to give oral hygiene instructions', (iii) 'to be professional in the role as a dental hygienist' and (iv) 'to have a supportive working environment in order to feel satisfaction with the work and to reach desirable treatment results'. The results described a process illuminating the DHs' views on important factors with regard to how to communicate oral health issues and accomplish beneficial behaviour changes in the prevention and treatment of periodontal disease. Furthermore, the result elucidates the importance of building a trustful relationship with the patient, feeling secure in one's professional role as a DH, and the importance of having support from colleagues and the clinical manager to be successful in the prevention and treatment of periodontal disease.
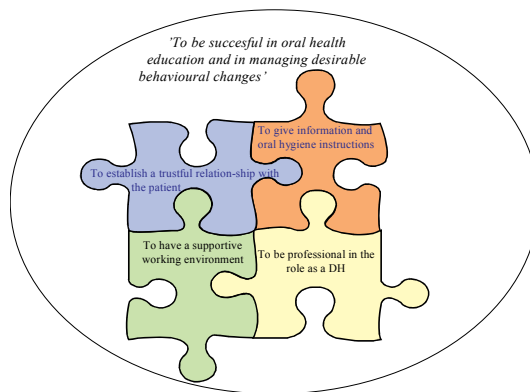


Fig 3. A conceptual model illuminating DHs' views on factors of importance for how 'to be successful in oral health education and managing desirable behaviour change'.

# Motivational Interviewing (MI) as an additive means to improve adherence to periodontal infection control

The effect of a single session of Motivational Interviewing (MI) on the standard of self-performed periodontal infection control among patients referred for treatment of chronic periodontitis (Study IV) is presented in Table 4. At baseline, the mean full mouth MBI score was 37 % in the test (MI intervention) and 33 % in the control group (*p* >0.05). The corresponding mean plaque scores were 50 % and 43 %, respectively (*p* >0.05).

The examination performed after the MI intervention revealed a negligible decrease (3-4 %) in MBI and plaque scores that was not significantly different from the changes observed in the control group without any intervention. In contrast, a marked reduction in MBI and plaque scores was seen for both groups after the first session of information and oral hygiene instruction given by a DH; MBI score -11 % and -9 % and plaque score -22 % and -17 % for the test and the control group, respectively. At the final six-month examination, a further improvement in both MBI and plaque scores was observed, resulting in a mean full mouth MBI score of 19 % and 18 % in the test and the control group, respectively. The final mean full-mouth plaque score was 25 % in the test and 19 % in the control group. There was no statistically significant difference in mean MBI and plaque scores between the two study groups at any of the examination intervals, neither for full mouth nor for proximal areas.

Table 4. Mean values (S.D.) of Marginal Bleeding Index (MBI) and Plaque score at baseline and at the various examination intervals in the Test (MI) and Control groups

|  | Examination | Test (MI) | Control | Sign. |
|---|---|---|---|---|
| **MBI (%)** | **Week** |  |  |  |
| *Full mouth* |  |  |  |  |
| Baseline | 0 | 36.6 (17.1) | 33.0 (12.4) | NS |
| After MI | 2 | 33.9 (16.9) | 34.9 (15.9) | NS |
| After DH | 4 | 26.0 (17.1) | 24.0 (14.2) | NS |
| Re-exam. | 12 | 21.0 (12.5) | 16.2 (13.4) | NS |
| Final exam. | 26 | 18.8 (10.9) | 18.4 (14.1) | NS |
|  |  |  |  |  |
| **Plaque (%)** |  |  |  |  |
| *Full mouth* |  |  |  |  |
| Baseline | 0 | 50.2 (21.5) | 43.1 (19.2) | NS |
| After MI | 2 | 46.2 (19.5) | 40.2 (21.3) | NS |
| After DH | 4 | 28.4 (16.5) | 26.2 (17.1) | NS |
| Re-exam. | 12 | 27.1 (15.2) | 19.0 (13.3) | NS |
| Final exam. | 26 | 25.2 (15.4) | 18.6 (13.2) | NS |

NS, not statistically significant (Student's *t*-test); S.D., standard deviation.

## *Correlations between clinical data and individual characteristics*

The MBI score at the final six-month examination was significantly correlated to gender ($r_s$ = 0.51; $p$ <0.001) and baseline MBI and plaque scores ($r_s$ = 0.52 and 0.55, respectively, $p$ <0.001). Thus, higher MBI scores at the final examination were related to being male and having a higher baseline MBI and plaque scores. Higher PI scores at the final six-month examination were associated with being male ($r_s$ = 0.36; $p$ <0.05), non-smoker ($r_s$ = -0.31; $p$ <0.05) and having higher baseline scores of MBI ($r_s$ = 0.54; $p$ <0.01) and plaque ($r_s$ = 0.56; $p$ <0.01).

Both the test and the control subjects showed a high degree of motivation to treatment at baseline; mean value 88.6 % and 82.7 %, respectively ($p$ >0.05). Baseline assessments of motivation and willingness to engage in periodontal treatment revealed no significant correlation with the six-month clinical outcome.

## *Multiple logistic regression analysis*

In the total patient sample, 66 % reached a full-mouth MBI score of ≤20 % at the final examination, which may be considered a desirable goal following cause-related periodontal therapy (59 % in the test and 73 % in the control group; *p* >0.05) and 57 % a corresponding level of plaque (41 % in the test and 73 % in the control group; *p* <0.05).

Logistic regression models (forward stepwise) were formulated to identify potential predictors of a desirable final MBI and a plaque score of ≤20 %, respectively. The independent variables included in the regression models were treatment group, gender, smoking and baseline MBI and plaque scores. As shown in Table 5, the only explanatory variable of a final MBI score of ≤20 % that was entered into the model was gender (OR 0.1), while the baseline plaque score predicted a corresponding final plaque score (OR 0.9). Hence, an MBI score of ≤20 % at the end of treatment was associated with being female and a high plaque score at baseline counteracted a desirable final plaque score of ≤20 %. The level of explained variance ($R^2$) for the two models was 28 and 41 %, respectively.

Table 5. Logistic regression analysis (forward stepwise) predicting outcome of MBI ≤ 20 % and PI ≤ 20 %

| Variable | β | S.E. | OR | CI 95% | P value |
|---|---|---|---|---|---|
| *Final MBI ≤ 20 %* | | | | | |
| Gender (female) | -2.2 | 0.8 | 0.1 | 0.02-0.47 | 0.03 |
| *Final PI ≤ 20 %* | | | | | |
| PI (baseline) | -0.1 | 0.02 | 0.9 | 0.89-0.97 | 0.001 |

Nagelkerke $R^2$ for MBI=0.28; PI=0.41

# Main findings

- Patients in treatment for periodontitis experienced feelings of vulnerability. Communication with the specialist team and receiving adequate information about the disease and the treatment were important to gain insight and understand the seriousness of the disease condition. The knowledge gained about means to achieve oral health and prevent further disease progression decreased the patients' anxiety and increased their feelings of control of the situation *(Study I)*.

- The DHBS questionnaire was found to be a valid and reliable scale for assessing patients' attitudes to dental hygienists. Furthermore, negative dental hygienist beliefs were associated with dental anxiety *(Study II)*.

- Dental hygienists elucidated the importance of building a trustful relationship with the patient, feeling secure in one's professional role and having support from colleagues and the clinical manager in order to be successful in the prevention and treatment of periodontal diseases *(Study III)*.

- A single freestanding MI session as a prelude to conventional treatment had no significant additive effect on the individuals' standard of self-performed infection control in a short-term perspective *(Study IV)*.

# Discussion

## Methodological considerations

The present thesis included both quantitative and qualitative research methods. All methods have their strengths and limitations. A broad base of scientific methodology contributes to the understanding of underlying psychosocial factors and interactions related to the concept of oral health and patients' willingness to adhere to different prevention and treatment programmes.

A qualitative and explorative design with in-depth interviews as the data collection method was used in Study I and III to explore the views of patients as well those of dental professionals; i.e., DHs, concerning oral health and interpersonal processes in the prevention and treatment of periodontal disease. Qualitative research methods include a *"systematic collection, organisation, and interpretation of textual material derived from talk or observations"* (Malterud, 2001, p.483). The principles of Grounded Theory (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Charmaz, 2000, 2006) were followed at every step and the interpretation of the data was made in close collaboration between the authors (representing different scientific disciplines) and strengthened by a high level of agreement. The interviews generated a large amount of data (Study I, >300; Study III, >400 pages of printed text) and saturation; i.e., new data do not bring anything vital to the analysis model, was reached within the study groups. The emerging categories were grounded in data and illustrated by interview quotations in order to show the trustworthiness of our interpretation of the data. This procedure is closely related to what is described as internal validity (Malterud, 2001). With regard to external validity, the aim of all research is to generate information that can be shared and applied beyond the specific study setting (Malterud, 2001). The findings of the current studies bring knowledge about psychosocial interactions in relation to the prevention and treatment of periodontal diseases that can be applied to similar groups of patients and dental professionals. Moreover, the findings may be valuable and

transferable to similar situations in general health care concerning treatment of chronic diseases.

In Study II, a partly new questionnaire, the Dental Hygienist Beliefs Survey (DHBS), was tested and evaluated. The questionnaire is based on a well-established questionnaire, the DBS-R (Abrahamsson et al., 2006), concerning attitudes to dentists. Shortcomings of the study may be the non-randomised selection of subjects (Abrahamsson et al., 2006), as well as the limited number of respondents in the severe dental fear group who had visited a DH. However, the strength of the study may be the different geographical and clinical location of the selected subjects as well as the distribution into groups of regular dental patients and students, suggesting that the results are representative of similar populations.

Study IV was a randomised, evaluator-blinded, controlled clinical trial with standardised procedures according to the study protocol. The study was performed at a specialist clinic, by an experienced DH and in accordance with established routines for educational intervention and non-surgical periodontal treatment. A psychologist with extensive experience and knowledge of the specific method conducted the MI sessions. The findings are thus limited to this specific context. The strength of the study is that the MI was conducted as a freestanding prelude to conventional treatment, making it possible to evaluate the effects of the MI intervention *per se*. Another strength is that all MI sessions were audiotaped in order to supervise the therapist regarding the methodological quality. In addition, to evaluate the methodological competence in the use of MI, 11 interviews (50 %) were randomly selected and coded by independent reviewers using the Motivational Interviewing Treatment Integrity (MITI 3.0) scale (Moyers et al., 2007). The coding of our MI sessions revealed average values ranging between 2.5 and 3.5, indicating areas for potential improvement of the MI technique.

# Patients' attitudes towards oral health and dental caregivers and experiences of periodontal treatment

The results of Study I illustrated the patients' vulnerability and their need to be treated respectfully by the specialist team. Most patients considered the specialist team to have good communicative skills. However, some participants described a more negative view and a perceived lack of communication during the treatment. They expressed it as being "treated like a child and lectured" by the DH and that this might have a negative influence on the treatment. Hence, in order to build a trustful treatment alliance it is obvious that both the professional's and the patient's communication skills have to be considered (Query & Kreps, 1996).

All the participants in Study I considered oral health to be very important. Nevertheless, they expressed frustration about the costs of treatment and the fact that the treatment of their chronic oral disease was not covered by the Swedish health care system, like other chronic diseases. However, the participants' attitudes towards treatment costs were somewhat mixed, depending on the perceived treatment outcome and/or the patient's economic situation. Some expressed it as "worth all the money in the world" to feel and look nice, while others considered the financial burden to "really hurt the most." The results of previous studies suggest that most people are willing to invest in oral health and consider it very important (Trulsson, 2002; Hallberg & Haag, 2007; Karlsson et al., 2009). This was also confirmed in our study. Even so, the results from Study I emphasise that the financial cost related to periodontal treatment is perceived as a problem that, for some patients, may be even more stressful than the periodontal treatment itself.

The final model of Study I that describes a psychosocial process related to the periodontal treatment (Fig. 3) may be discussed in relation to the "Self-regulation model" described by Leventahl et al. (1992; Ogden, 2000). According to the model by Leventhal, an individual may use different stages; i.e., interpretation, coping and

appraisal, in order to solve a problem and to accomplish a state of normality. Hence, in the present study the chronic periodontitis is the problem and the process described may be seen as the individuals attempt to achieve a state of control and "normality," with respect to their oral health situation. Moreover, the results of Study I corroborate the results of a study by Svensson et al. (2000) that described the importance of having feelings of trust towards the physician. It appears that the participants' feelings of vulnerability, trust and control are closely related to each other.

The results of Study II showed that the partly new questionnaire DHBS had acceptable psychometric properties with regard to validity and reliability in different student and patient groups. Moreover, patients' general perceptions about dentists and DHs were strongly connected. More recently, the DHBS has been further evaluated (Öhrn et al., 2008; Abrahamsson et al., 2012). The results of the study by Abrahamsson et al. (2012) strengthen the suggestion that the DHBS is a valid and reliable psychometric instrument to assess attitudes towards DHs. Moreover, the findings by Öhrn et al. (2008) showed that patients generally had somewhat less negative attitudes towards DHs than towards dentists. However, this was not the fact with respect to situations that may give rise to feelings of shame and guilt regarding oral hygiene and oral health conditions that were rated on a more negative level for DH. Such aspects are important to consider in oral health communication.

Negative dental hygienist beliefs were associated with dental anxiety. In all study groups, the highest ranked item of DHBS was item 23 'once I am in the dental hygienist's chair I feel helpless (things are out of my control).' The final multiple regression model showed that the DHBS items 23, 16 and 28 were the most important predictors of dental anxiety; i.e., items related to the patients' perceptions of communication and lack of control in relation to the treatment performed by the DH. The results of Study II may thus, in part, support the findings in Study I, suggesting that the communication between the patient and the dental caregiver is closely related to the patient's feelings of control and anxiety. Moreover, the strong predictive value

of item 23 supports the suggestion by De Jongh and Stouthard (1993), that a patient's helplessness and perceived lack of control are important contributors to anxiety about DH treatment.

# Dental hygienists' views on the importance of communication and interpersonal relationships in the prevention and treatment of periodontal disease

In-depth interviews with DHs (Study III) highlighted that good communication between the DH and the patient was crucial in order to build a trustful and confident relationship with the patient. Similar findings have been described in several health care studies with the focus on communication and interaction between nurses and patients (Sahlsten et al., 2005; Berg, 2006), as well as between doctors and patients (Pennbrandt, 2009), and, more recently, also among dental professionals and patients (Karlsson et al., 2009). It is important that the caregiver shows emotional involvement, maintains a caring relationship and confirms the patient's feelings. Furthermore, to acknowledging the person "behind the patient" and making the patient feel more secure and less vulnerable are important issues for the adherence to treatment regimens (Sahlsten et al. 2005). This is in line with what has previously been discussed; namely, that all available measures to access information about the patient must be used, as this will strengthen the treatment alliance and contribute to a successful treatment outcome (Freeman, 2009).

The results of Study I and III in the present thesis suggest that patients and dental hygienists essentially share the same views on the importance of communication and how to build a trustful treatment alliance. Pennbrandt (2009) described a similar situation where patients and their doctors largely had the same view on how to create a good relationship. However, it was suggested that the doctors might have created an ideal image, because the patients showed some criticism towards their doctors'

communicative skills. Similar results were shown in Study I, where some of the patients described a more negative view and a perceived lack of communication during the treatment. Hence, the suggestion by Pennbrandt (2009) could also be true among the DHs in the current study; i.e., that the DHs described how an ideal communication and a trustful relationship should be. However, this "ideal norm" was not reached in every meeting and situation and the DHs reported that a reason for not living up to their ideal norms regarding communication was most often a stressful work situation.

The DHs expressed concerns that dentists showed limited knowledge and interest in periodontology. Skaret and Soevdnes (2005) focused on DHs as key personnel in dental care and stressed that dental professionals have to work in a team, where the dentists also have sufficient qualifications and true involvement in the care of the patients. In our study, clinical pressure, financial demands and a non-supportive clinical climate were factors considered to contribute to general work stress and to have a negative influence on the professional satisfaction and treatment results of the DHs. Our findings support the observation reported by Holmgren (2008) that work-related stress among women in different professions was closely related to the interaction between the individual and the environment. Moreover, Petrén et al., (2007) showed that primarily role ambiguity but also management issues were associated with the work satisfaction of the DHs.

# Oral health educational interventions

## *Pedagogical skills in patient education*

The Swedish legislation concerning dentistry (SFS 1985:125) states that patients must receive information about oral disease and treatment alternatives. However, the findings in Study I elucidate the importance of adapting the information to meet each individual's needs. Thus, it is of the utmost importance that the caregivers make sure

that the patient understands the information; possibly even more important if the treatment outcome is considered doubtful. In a study by Abrahamsson et al. (2008), patients described that the stress they had felt after being diagnosed with chronic periodontitis made it difficult to take in and understand the extensive amount of new information. Kjellgren et al. (2000) pointed out that patient participation in the treatment and treatment decisions are utterly important and that caregivers should consider the patient's view about the disease and treatment before starting any patient education.

The treatment session at the specialist clinic included information about the disease as well as instructions in oral hygiene (Study I). Most patients described this as a dialogue between the specialist team and themselves rather than purely receiving information. Moreover, the DHs (Study III) emphasised the importance of a supportive approach with different pedagogical approaches to facilitate the learning situation. Friberg and Scherman (2005) suggested that in order to reach compliance and adherence in health care one must identify the patient's way of understanding and try to create the necessary conditions for understanding. Hence, there is a need for health professionals to have pedagogical knowledge. Moreover, Jallinoja et al. (2007) showed that physicians and nurses, who regularly supported patients in lifestyle changes, frequently felt a need for further skills in counselling. The results from Study III are in line with a recent study by Hult et al. (2009), showing that the pedagogical processes in health care are usually embedded, in part, in the treatment process. However, the health care professionals who participated in the study by Hult et al. (2009) also expressed that stressful working days were a reason for not reflecting on the own performance or learning from other colleagues. These results correspond well to our results (Study III), where DHs described a fairly stressful work situation, highlighting the importance of communicative and pedagogical skills and called for basic knowledge of the behavioural sciences in the DH education programme. Such aspects need to be considered in dentistry and focused on in educational and training programmes for dental professionals.

## MI as an additive means to improve adherence to self-performed periodontal infection control

The results of Study IV revealed no immediate positive effects of a single session of MI on the standard of self-performed periodontal infection control by periodontal patients. Neither was any additive effect of the initial MI session seen on oral hygiene conditions subsequent to information given about periodontitis and oral hygiene instructions. The observed lack of beneficial effects with the single pre-treatment MI session may be due to several reasons. Patients' motivation and willingness to engage in treatment is an important and significant predictor of the treatment outcome among dental fear patients (Abrahamsson et al., 2003). In the current study, the patients in both the test and the control group reported high treatment motivation (83-89 %). Moreover, MI also includes stages of ambivalence and readiness for beneficial behaviour changes (Miller & Rollnick, 2002). Patients referred to a specialist clinic for periodontal treatment may have passed the stage of ambivalence and are consequently ready and motivated to adhere to the treatment. A previous study (Abrahamsson et al., 2008), based on in-depth interviews with patients referred for periodontal treatment, supports this interpretation. These patients stated that their severe oral disease became obvious to them with the referral to a specialist clinic and that they were willing to invest all that was required in terms of effort, money and time to become "healthy". Hence, since MI seems to be particularly efficient for individuals with poor motivation (Hettema & Hendricks, 2010), one explanation of the lack of a positive, additive effect of the MI session in our study may be that the patients were already highly motivated when entering into the study.

Rohsenow et al. (2004) found that MI was especially useful for those with poor motivation and suggested that highly motivated individuals may need a more directive counselling approach. In Study IV, the most prominent improvement in self-performed periodontal infection control was seen after the DHs educational intervention. This finding is in line with the suggestion by Rohsenow et al. (2004) to use a direct counselling approach to highly motivated patients. Another factor to

consider is the communication with and trust in the caregiver. A recent study showed that patients want the physician to be personal and create a good dialogue, and that a good relationship between the patient and the caregiver may have long-term effects in lifestyle counselling (Walseth et al., 2011). Study IV was performed at a specialist clinic for periodontal treatment, by experienced DHs and in accordance with an established protocol for oral hygiene educational interventions. The findings are thus limited to this specific context and comparable studies in general dental practices are warranted.

Beside the importance of the skills of the therapist, it was suggested that the length and number of MI sessions might have an impact on the patients' behaviour changes (Martins & McNeil, 2009; Weinstein et al., 2011). Jönsson et al. (2009) used MI as an integrated part of an ambitious individually tailored health education programme and revealed superior outcomes compared to standard programmes for self-performed periodontal infection control. In Study IV, the test group received a single session of motivational interviewing (MI) before the initiation of the periodontal treatment, lasting, on average, 45 min, together with a clinical psychologist with extensive experience of the specific method. Godard et al. (2011) used a somewhat similar study approach with only one MI session at baseline in conjunction with the oral hygiene information and instruction. Moreover, the MI session in this study was performed by two experienced periodontists and lasted approximately 15-20 minutes. The results at the one-month follow-up were promising, by showing improved oral hygiene compared to the control group (Godard et al., 2011). The results from the studies by Jönsson (2009) and Godard (2011) suggest that one or more MI session in connection with oral hygiene information and subsequent treatment sessions, and performed by a dental professional, might be a promising approach.

# Future considerations

The results from the present thesis have elucidated the communicative aspects and psychosocial interactions of importance in the prevention and treatment of periodontal diseases. This knowledge may be useful in dental clinical practice and for the development of patient-centred oral health educational interventions and treatment programmes. Future studies should be directed towards a deeper understanding of how such communicative and psychosocial interactions may contribute to the effectiveness of different interventions in order to promote oral and periodontal health. Hence, it is important to further investigate:

- Factors of importance for the development of a "good treatment alliance" and how the treatment alliance interacts with patients' willingness to adhere to prevention and treatment programmes;

- Factors related to the training and education of dental professionals, their working conditions and the clinical environment, and how such factors interact with the quality and efficiency of prevention and periodontal treatment programmes.

- The potential additive effect of a directive patient-centred communicative method, MI, to improve adherence to periodontal infection control programmes, (i) in a long-term perspective, (ii) on patients in general dental practice, and (iii) in patients with a low degree of motivation for beneficial oral hygiene behavioural efforts.

- The effectiveness and validity of MI as an additive measure to other interventions/conventional treatment programmes in relation to professional skills and different methodological approaches.

# References

Abrahamsson KH, Andersson P, Krok L & Hakeberg M (2012). Evaluation of the Dental Hygienist Beliefs Survey; test-retest assessment in a group of general dental patinets. *International Journal of Dental Hygiene* 10: 30-35.

Abrahamsson KH, Berggren U, Hakeberg M & Carlsson SG (2003). The importance of dental beliefs for the outcome of dental-fear treatment. *European Journal of Oral Sciences* 111: 99-105.

Abrahamsson KH, Hakeberg M, Stenman J & Öhrn K (2006). Dental beliefs: evaluation of the Swedish version of the revised Dental Beliefs Survey in different patient groups and in a non-clinical student sample. *European Journal of Oral Sciences* 114: 209-215.

Abrahamsson KH, Wennström JL & Hallberg U (2008). Patients' views on periodontal disease; attitudes to oral health and expectancy of periodontal treatment: a qualitative interview study. *Oral Health & Preventive Dentistry* 6: 209-216.

Airila-Mansson S, Bjurshammar N, Yakob M & Söder B (2007). Self-reported oral problems, compared with clinical assessment in an epidemiological study. *International Journal of Dental Hygiene* 5: 82-86.

Almomani F, Williams K, Carley D & Brown C (2009). Effects of an oral health program in people with mental illness. *Journal of Dental Research* 88: 648-652.

Bandura A (2004). Health Promotion by Social Cognitive Means. *Health Education & Behaviour* 31: 143-164.

Berg L & Danielsson E (2006). Patients' and nurses' experiences of the caring relationship in hospital: an aware striving for trust. *Scandinavian Journal of Caring Sciences* 21: 500-506.

Berggren U & Carlsson SG (1985). Usefulness of two psychometric scales in Swedish patients with severe dental fear. *Community Dentistry & Oral Epidemiology* 13: 70-74.

Charmaz K (2000). *Grounded Theory: Objectivist and constructivist methods.* In: Denzin NK, Lincoln YS (eds) *Handbook of Qualitative Research*, (2nd edn). California: Sage Publications, 509-536.

Charmaz K (2006). *Constructing grounded theory. A practical guide through qualitative analysis.* London: Sage Publications.

Collins K & O'Cathain A (2003). The continuum of patient satisfaction- from satisfied to very satisfied. *Social Science & Medicine* 57: 2465-2470.

Corah N (1969). Development of a dental anxiety scale. *Journal of Dental Research* 48: 596.

Cunha-Cruz J, Hujoel PP & Kressin NR (2007). Oral health-related quality of life of periodontal patients. *Journal of Periodontal Research* 42: 169-176.

De Jong A & Stouthard ME (1993). Anxiety about dental hygienists treatment. *Community Dentistry and Oral Epidemiology* 21: 91-95.

Elvins R & Green J (2008). The conceptualization and measurement of therapeutic alliance: an empirical review. *Clinical Psychology Review* 28: 1167-1187.

Faul F, Erdfelder E, Lang AG & Buchner A (2007). G*Power 3: A flexible statistical analysis program for the social, behavioral and biomedical sciences. *Behavior Research Methods* 39: 175-191.

Freeman R (1999). The psychology of dental patient care: Communicating effectively: some practical suggestions. *British Dental Journal* 187: 240-244.

Freudenthal JJ & Bowen DM (2010). Motivational Interviewing to decrease parental risk-related behaviours for early childhood caries. *Journal of Dental Hygiene* 84: 28-33.

Friberg FS & Hansson M (2005). Can a teaching and learning perspective deepen understanding of the concept of compliance? A theoretical discussion. *Scandinavian Journal of Caring Science* 19: 274–279.

Glaser BG & Strauss A (1967). *The discovery of grounded theory. Strategies for qualitative research.* Chicago: Aldline.

Godard A, Dufour T & Jeanne S (2011). Application of self-regulation theory and motivational interview for improving oral hygiene: a randomized controlled trial. *Journal of Clinical Periodontology* 38: 1099-1105.

Hallberg U & Haag P (2007). The subjective meaning of dentition and oral health: Struggling to optimize one's self-esteem. *International Journal of Qualitative Studies on Health and Well-Being* 2: 86-92.

Harrison R, Benton T, Everson-Stewart S & Weinstein P (2007). Effect of motivational Interviewing on rates of early childhood caries: a randomized trial. *Pediatric Dentistry* 29: 16-22.

Hettema J, Steele J & Miller WR (2005). Motivational interviewing. *Annual Review of Clinical Psychology* 1: 91-111.

Hettema JE & Hendricks PS (2010) Motivational interviewing for smoking cessation: a meta-analytic review. *Journal of Consulting and Clinical Psychology* 78: 868-884.

Holmgren K (2008). *Work-related stress in women.* (Thesis) Department of Clinical Neuroscience and Rehabilitation/Occupational Therapy, The Sahlgrenska academy, University of Gothenburg: Sweden.

Horne R, Barber N, Elliot R & Morgan M (2005). Concordance, adherence and compliance in medicine taking. National Co-ordination Centre for NHS Service Delivery and Organisation R & D (NCCSDO) from: http://www.google.se/#hl=sv&sclient=psy-ab&q=compliance+adherence+horne+et+al+2005+&oq=compliance+adherence+horne+et+al+2005+&gs_l=serp.12...3760.10235.0.12660.25.23.2.0.0.0.74.1177.23.23.0...0.0...1c.wipEyWcKXRg&pbx=1&bav=on.2,or.r_gc.r_pw.r_qf.,cf.osb&fp=701e721c7afabdb8&biw=1186&bih=971

Hugoson A, Kock G & Johansson S (2003). *Oral Hälsa: Konsensuskonferens.* Förlagshuset Gothia, Jönköping (In Swedish).

Hugoson A, Sjödin B & Norderyd O (2008). Trends over 30 years, 1973-2003, in the prevalence and severity of periodontal disease. *Journal of Clinical Periodontology* 35: 405-414.

Hult H, Lindblad Fridh M, Lindh Falk A & Thörne K (2009). Pedagogical Processes in Healthcare: An Explanatory Study of Pedagogic Work with Patients and Next of Kin. *Education for Health* 22: 1-11.

Ismail AI, Ondersma S, Willem Jedele JM, Little RJ & Lepkowski JM (2011). Evaluation of a brief tailored motivational intervention to prevent early childhood caries. *Community Dentistry and Oral Epidemiology* 39: 433-448.

Jallinoja P, Absetz P, Kuronen R, Nissinen A, Talja M, Uutela A & Patja K (2007). The dilemma of patent responsibility for lifestyle change: perceptions among primary care physicians and nurses. *Scandinavian Journal of Primary Health Care* 25: 244-249.

Jönsson B, Öhrn K, Oscarsson N & Lindberg P (2009). The effectiveness of an individually tailored oral health educational programme on oral hygiene behaviour in patients with periodontal disease: a blinded randomized-controlled clinical trial (one-year follow-up). *Journal of Clinical Periodontology* 36: 1025-1034.

Jönsson B, Öhrn K, Lindberg P & Oscarsson N (2010). Evaluation of an individually tailored oral health educational programme on periodontal health. *Journal of Clinical Periodontology* 37: 912-919.

Karlsson E, Lymer U-B & Hakeberg M (2009). Periodontitis from the patient's perspective, a qualitative study. *International Journal of Dental Hygiene* 7: 23-30.

Kay L & Locker D (1997). *Effectiveness of oral health promotion: a review.* London: Health Education Authority.

Kjellgren KI, Svensson S, Ahlner J & Säljö R (2000). Antihypertensive treatment and patient autonomy – the follow-up appointment as a resource for care. *Patient Education and Counseling* 40: 39-49.

Leung WK, Ng DKC, Jin L & Corbet EF (2006). Tooth loss in treated periodontitis patients responsible for their supportive care arrangements. *Journal of Clinical Periodontology* 33: 265-275.

Leventahl H, DiefenbachM & Leventahl EA (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Therapy and Research* 16: 143-163.

Malterud K (2001). Qualitative research: standards, challenges, and guidelines. *The Lancet* 358: 483-488.

Marks DF, Murray M, Evan B, Willig C, Woodall C & Sykes CM (2006). *Health Psychology Theory, Research & Practice.* London, Sage Publications.

Martins RK & McNeil DW (2009). Review of Motivational Interviewing in promoting health behaviors. *Clinical Psychology Review* 29: 283-293.

Miller WR (1996). Motivational Interviewing: Research, practice, and puzzles. *Addictive Behaviours* 21: 835-842.

Miller WR & Rollnick S (1991). *Motivational interviewing, preparing people to change addictive behavior.* New York, The Guildford Press.

Miller WR & Rollnick S (2002). *Motivational Interviewing. Preparing People for Change.* Guildford Press. New York, London.

Moyers TB, Martin T, Manuel JK, Hendrickson SML & Miller WR (2005). Assessing competence in the use of motivational interviewing. *Journal of Substance Abuse Treatment* 28: 19-26.

Mårtensson C, Söderfeldt B, Axtelius B & Andersson P (2012). Expectations and satisfaction with care for periodontal specialist patients. Submitted.

Needleman I, McGrath C, Floyd P & Biddle A (2004). Impact of oral health on the life quality of periodontal patients. *Journal of Clinical Periodontology* 31; 6, 454-457.

Ng SK & Leung WK (2006). Oral health related quality of life and periodontal status. *Community Dentistry and Oral Epidemiology* 34; 2, 114-122.

Ogden J (2000). *Health Psychology: A Textbook.* Open University Press; 2nd Revised edtition.

Ojima M, Kanagawa H, Nishida N, Nagata H, Hanioka T & Shizukuishi (2005). Relationships between attitudes toward oral health at initial office visit and compliance with supportive treatment. *Journal of Clinical Periodontology* 32: 364-368.

Papanou PN & Lindhe J (2008). Epidemiology of Periodontal Diseases. In: Lindhe J, Lang NP & Karring T (eds.). *Clinical Periodontology and Implant Dentistry,* 5th Edition. UK: Blackwell Munksgaard.

Pennbrandt S (2009). *How elderly patients, relatives and doctors experience their meeting. A sociocultural study in a hospital setting.* (In Swedish) Thesis. Institute of Health and Care Sciences. The Sahlgrenska academy, University of Gothenburg: Sweden.

Petren V, Levin G, Chohan T, Preber H, Candell A & Bergstrom J (2005). Swedish dental hygienists' preferences for workplace improvement and continuing professional development. *International Journal of Dental Hygiene* 3: 117-125.

Philippot P, Lenoir N, D'Hoore W & Bercy P (2005). Improving patients' compliance with the treatment of periodontitis: a controlled study of behavioural intervention. *Journal of Clinical Periodontology* 32: 653-658.

Query JL & Kreps GL (1996). Testing a relational model for health communication competence among caregivers for individuals with Alzheimer's disease. *Journal of Health Psychology* 1: 335-351.

Ramseier CA, Catley D, Krigel S & Bagramian RA (2008). Motivational Interviewing. In: Lindhe, J., Lang, N.P. & Karring, T. (eds.) *Clinical Periodontology and Implant Dentistry,* 5th Edition. UK: Blackwell Munksgaard.

Renz A, Ide M, Newton T, Robinson PG & Smith D (2007). Psychological interventions to improve adherence to oral hygiene instructions in adults with periodontal diseases. *Cochrane Database of Systematic Reviews* 2: 1-20, Art. No.:CD005097, doi: 10.1002/14651858. pub2.

Rohsenow DJ, Monti PM, Martin RA, Colby SM, Myers MG, Gulliver SB, Brown RA, Meuller TI, Gordon A & Abrams DB (2004). Motivational enhancement and coping skills training for cocaine abusers: Effects on substance use outcomes. *Addiction* 99: 862-874.

Ruback S, Sandbeck A, Lauritzen T & Christensen B (2005). Motivational Interviewing: A systematic review and meta-analysis. *British Journal of General Practice* 55: 305-312.

Rylander H & Lindhe J (1997). Cause-Related Periodontal Therapy. In: Lindhe J Karring T & Lang NP (eds.) *Clinical Periodontology and Implant Dentistry,* 3rd Edition. UK: Blackwell Munksgaard.

Sahlsten MJ, Larsson IE, Lindencrona CS & Plos KA (2005). Patient participation in nursing care: an interpretation by Swedish registered nurses. *Journal of Clinical Nursing* 14: 35-42.

SBU (2004). *Kronisk Pardontit-Prevention, Diagnostik och Behandling: Statens Beredning för Medicinsk Utvärderig* (In Swedish). Stockholm: The Swedish Council on Technology Assessment in Health Care.

SFS 1985:125. Svensk författningssamling 1985:125. Tandvårdslag (1985:125).

Skaret E & Soevdsnes EK (2005). Behavioural science in dentistry. The role of the dental hygienist in prevention and treatment of the fearful dental patient. *International Journal of Dental Hygiene* 3: 2-6.

Skaret E, Weinstein P, Kvale G & Raadal M (2003). An intervention program to reduce dental avoidance behaviour among adolescents: a pilot study. *European Journal of Pediatric Dentistry* 4: 191-196.

Socialstyrelsen (2011). *Nationella riktinjer för vuxentandvård-stöd för styrning och ledning.* Västerås, Edita Västra Aros.

Strauss A & Corbin J (1990). *Basics of qualitative research. Grounded theory procedures and Techniques.* California: Sage Publications.

Strauss A & Corbin J (1998). *Basics of qualitative research. Techniques and procedures for developing grounded theory* (2nd edn). California: Sage Publications.

Ståhlnacke K, Söderfeldt B, Unell L, Halling A & Axtelius B (2007). Tillfredsställelse med tandvård i en svensk cohort. Del II. (In Swedish) *Swedish Dental Journal* 31: 137-146.

Svensson S, Kjellgren KI, Ahlner J & Säljö R (2000). Reasons for adherence with antihypertensive medication. *International Journal of Cardiology* 76: 157-163.

Trulsson U, Engstrand P, Berggren U, Nannmark U & Brånemark PI (2002). Edentulousness and oral rehabilitation: experiences from the patients' perspective. *European Journal of Oral Sciences* 110: 417-424.

Umaki TM, Umaki MR & Cobb CM (2012). The psychology of patient compliance: a focused review of the literature. *Journal of Periodontology* 83: 395-400.

Walseth Tveit L, Abildsnes E & Schei E (2011). Patients' experiences with lifestyle counselling in general practice: A qualitative study. *Scandinavian Journal of Primary Health Care* 29: 99-103.

Weinstein P, Harrison R, & Benton T (2004). Motivating parents to prevent caries in their young children-one year findings. *JADA* 135: 731-737.

Weinstein P, Harrison R, & Benton T (2006). Motivating mothers to prevent caries. Confirming the beneficial effect of counselling. *JADA* 137: 789-790.

Weinstein P (2011). Motivational Interviewing Concepts and the Relationship to Risk Management and Patient Counseling. *Journal of the California Dental Association* 39: 742-745.


Yevlahova D & Satur J (2009). Models for individual oral health promotion and their effectiveness: a systematic review. *Australian Dental Journal* 54: 190-197.


Öhrn K, Hakeberg M & Abrahamsson KH (2008). Dental beliefs, patients' specific attitudes towards dentists and dental hygienists: a comparative study. *International Journal of Dental Hygiene* 6: 205-213.