

PadoGen

► Analysis of genetically-related susceptibility to inflammation

The main cause of periodontal diseases is the presence of a microbiological imbalance in the gingival sulcus. In this dysbiotic state, the physiological bacterial flora has been displaced by primarily anaerobic indicator germs. However, the root cause of the destruction of the periodontal apparatus is the patient's individual immune response to this pathogenically changed bacterial flora.

A central role is played by the pro-inflammatory cytokines interleukin-1A (IL-1A), interleukin-1B (IL-1B) and their counterparts, the interleukin-1 receptor antagonist (IL-1-RN) and the tumour necrosis factor α (TNF- α). While the pro-inflammatory messenger substances IL-1-A, IL-1-B and TNF- α foster the breakdown of bone and soft tissue and increase the inflammatory response, the anti-inflammatory IL-1-RN counteracts these reactions. Accordingly, the extent of the inflammatory response is determined by the ratio of the pro-inflammatory and anti-inflammatory cytokines.

The quantity of the individual messenger substances that is formed in response to an existing stimulus is genetically determined. Patients with certain changes in the genes that code for IL-1A, IL-1B and TNF- α respond to an exogenous inflammatory stimulus (e.g. periodontopathogenic bacteria) with excessive production of the corresponding cytokines. If a change is present in the IL-1-RN gene, a reduced quantity is formed and it is only able to inhibit the inflammation to an inadequate extent. On the whole, affected patients present significantly increased bone loss and a generally increased susceptibility to inflammation. The degree of the genetically-related susceptibility to inflammation depends on the number of gene changes present (polymorphisms) and the ratio of pro-inflammatory and anti-inflammatory cytokines (grades 0-4).

While patients with grades 0 and 1 reveal normal inflammatory responses, patients with grades 2-4 react to external stimuli with an excessive inflammatory response. The risk of a genetically-related increased susceptibility to inflammation increases along with the number of associated polymorphisms.

Polymorphism	Grade	Inflammatory response
keine	0	No increased genetically-related susceptibility to inflammation
IL-1 RN	1	Slightly increased genetically-related susceptibility to inflammation
IL-1 A/B or TNF- α	2	Increased genetically-related susceptibility to inflammation
IL-1 A/B + TNF- α or IL 1 A/B + IL-1-RN or TNF- α + IL-1-RN	3	Highly increased genetically-related susceptibility to inflammation
IL-1 RN + IL-1 A/B + TNF- α	4	Very highly increased genetically-related susceptibility to inflammation

Therapeutic consequence

In combination with the extent of a patient's subgingival microbial load and any additional risk factors, knowledge of the **PadoGen** grade enables sounder treatment planning.

The following are recommended for grade 2-4 patients:

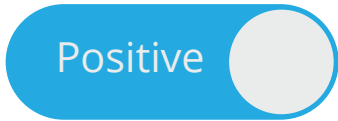
- Antimicrobial and, if necessary, anti-inflammatory therapy
- A recall programme with shorter intervals
- Motivation for optimum oral hygiene and compliance
- Avoidance of exogenous risk factors (e.g. smoking, stress, lack of oral hygiene)



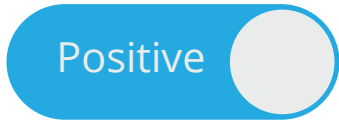
Indication

- ▶ Differential diagnosis with above-average disease progression despite inconspicuous microbiological findings
- ▶ Estimation of the course of therapy and treatment planning with periodontitis and peri-implantitis
- ▶ Risk analysis prior to implants (particularly in the case of smokers: increased legal security and patient compliance)
- ▶ Clarification of hereditary predisposition

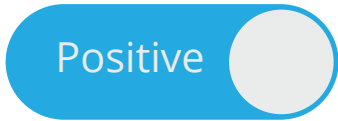
PadoGen example finding



IL-1 A/B



TNF-α



IL-1-RN

Genetically-related susceptibility to inflammation of grade 4

The analysed gene polymorphisms indicate a **very highly increased genetically-related risk** of periodontal diseases with increased production of the pro-inflammatory cytokines IL-1 and TNF-α with reduced production of the anti-inflammatory IL-1 receptor antagonist at the same time.

IL-1 A/B	positive / CT / heterozygous
TNF-α	positive / AA / homozygous
IL-1 RN	positive / TC / heterozygous

Patients with a genetically-related susceptibility to inflammation of grade 4 have a very highly increased risk of progressive forms of periodontitis or implant complications. The reduction of further risk factors as well as anti-inflammatory therapy (aromatic oils, NSAIDs) and recalls at shorter intervals to monitor the clinical situation are urgently recommended.

Note
Since the presence of periodontopathogenic bacteria can lead to an excessive inflammatory response in patients with a high **PadoGen** grade, regularly checking the bacterial load with the **PadoTest**[®] is recommended.

Smoking status: smoker
Tobacco consumption has a negative influence on the patient's immunological and microbiological situation and goes hand-in-hand with reduced treatment success. Smokers with a genetically-related increased susceptibility to inflammation have a significantly increased risk of periodontitis and implant complications or loss.

Sampling

With **PadoGen**, the genetically-related susceptibility to inflammation can be analysed using the **PadoTest**[®] samples. Separate sampling is not necessary.

Price

The price of this analysis, which is required once in a lifetime, is **€59.00 including VAT**.

Accounting

The **PadoGen** analyses are invoiced on a monthly basis. Each invoice includes itemised statements for forwarding to the patient. These show a statement of costs in accordance with the German Scale of Medical Fees (GOÄ) (Germany) and can therefore be submitted to the health insurance company (without any guarantee of reimbursement). Optionally, invoicing can also take place directly to the patient.

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