

Salivary Hormone Testing for Aging and Menopause

Effective: March 1, 2019

Next Review: January 2020

Last Review: January 2019

IMPORTANT REMINDER

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

DESCRIPTION

Saliva tests have been proposed as an alternative to blood tests to measure hormone levels. Many of these tests are sold directly to consumers.

MEDICAL POLICY CRITERIA

Salivary hormone testing is considered **investigational** for the screening, diagnosis, and/or monitoring of aging and menopause. Salivary hormone tests include, but are not limited to:

1. Cortisol
2. Dehydroepiandrosterone (DHEA)
3. Estrogen
4. Melatonin
5. Progesterone
6. Testosterone

NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.

CROSS REFERENCES

None

BACKGROUND

For several decades, there has been interest in testing various hormone levels using saliva as the specimen rather than blood, plasma, or urine. Salivary testing has been viewed as potentially advantageous due to its noninvasive nature and the relative ease and convenience of sample collection, which can be done in the home.

Consumers now have the ability to order home saliva tests over the internet for some hormones such as estrogen, progesterone, testosterone, melatonin, cortisol, and dehydroepiandrosterone (DHEA). A physician's prescription is not required for these saliva tests, which are primarily promoted for the evaluation of menopause and aging.

EVIDENCE SUMMARY

Assessment of a diagnostic technology typically focuses on three main principles:

1. **Technical feasibility-** of a device is typically assessed with two types of studies, those that compare test measurements with a gold standard and those that compare results taken with the same device on different occasions (test-retest). Demonstration of technical feasibility should include an assessment of its reproducibility and precision.
2. **Diagnostic performance-** is evaluated by the ability of a test to accurately diagnose a clinical condition in comparison with the gold standard. The sensitivity of a test is the ability to detect a disease when the condition is present (true-positive), while specificity indicates the ability to detect patients who are suspected of disease but who do not have the condition (true-negative). Evaluation of diagnostic performance, therefore, requires independent assessment by the 2 methods in a population of patients who are suspected of disease but who do not all have the disease.
3. **Clinical utility-** is evidence that assess the improvement of clinical outcomes directly related to testing. While in some cases, tests can be evaluated adequately using technical and diagnostic performance, when a test identifies a new or different group of patients with a disease; randomized trials are needed to demonstrate the impact of the test on the net health outcome.

The focus of this review is on evidence related to the ability of test results to:

- Guide decisions in the clinical setting related to either treatment, management, or prevention, and
- Improve health outcomes as a result of those decisions.

Technical Feasibility

Hormone concentrations in saliva are subject to a number of factors, which influence their correlation with the total plasma concentration, or the unbound ("free") fraction of hormone. Such factors include: binding affinity for specific protein carriers; saliva flow; use of

pharmacologic agents, which may disturb the ratio of free to bound hormone by displacing the bound hormone; metabolism of the hormone by salivary gland epithelial cells or oral bacteria; circadian rhythms; and contamination of the saliva specimen with blood, food, gingival fluid, or tissue debris.^[1,2] Despite these variables, the technical feasibility of measuring some salivary hormone levels has been demonstrated in some published studies. However, it is not clear that standardized protocols for measuring salivary hormone levels are established.^[1,3]

There also continues to be a need for a protocol for sample collection and handling. Whembolua studied the saliva sample of 19 healthy adults who provided saliva samples upon rising in the morning, rinsing their mouths with water, and then donated a second specimen 10 minutes later.^[4] Samples were either left untreated or passed through a 0.22-micron filter and then frozen at -80°C or incubated at room temperature for 10 days. Aliquots of each sample were cultured on agar to determine baseline and post-incubation (or freezing) bacteria load. Bacteria counts were not significantly influenced by rinsing (with water), were substantially reduced by filtration, and increased by incubation at room temperature. Average levels of salivary testosterone and cortisol, but not DHEA, were significantly lower in samples stored at room temperature than samples frozen the day of collection. The change in bacteria count induced by storing samples at room temperature was associated with a change in testosterone, but not cortisol or DHEA. When samples were passed through a 0.22-micron filter, bacteria counts were reduced and the association between bacteria and testosterone was reduced to nonsignificant. These findings contribute to a growing body of literature revealing that the process of sample collection, storage, and handling can dramatically influence the accuracy of information generated when salivary biomarkers are integrated into research and clinical diagnostics.

Diagnostic Performance

There are no published studies documenting sensitivity, specificity, or positive and negative predictive values for any salivary hormones when used to diagnose, treat, or monitor menopause or aging.

Clinical Utility

Geoffroy published a large study assessing the relationship between cortisol levels and cognitive deficits with aging, in 4655 patients.^[5] A total of four salivary samples were obtained from each patient; two at 45 years: one taken 45 minutes after waking and another three hours later, and then two at 50 years using the same sampling method. Authors reported an association between increased cortisol levels and a reduction in verbal memory and fluency tests at 50 years compared to initial scores. Although these results suggest an association between increased salivary cortisol measurements and some cognitive deficits over time, the evidence does not demonstrate that salivary hormone testing reliably improves clinical decision-making or health outcomes related to age-related cognitive function. In addition, it is unclear if the same results would have been reached if cortisol levels had been measured using some other method, such as blood sampling.

Additional association studies have been identified in the literature^[6-9]; however, there are no published clinical trials that demonstrate how the results of salivary hormone testing can be used clinically to direct patient treatment of menopause or aging.

PRACTICE GUIDELINE SUMMARY

THE AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS AND THE AMERICAN SOCIETY OF REPRODUCTIVE MEDICINE PRACTICE COMMITTEE^[10]

In 2014, the American College of Obstetricians (ACOG) and Gynecologists and the American Society of Reproductive Medicine Practice Committee (ASRM) reaffirmed a joint committee opinion on the use of bioidentical hormone therapy as a treatment for menopause. Bioidentical hormones are identical in molecular structure to women's endogenous hormones, but are synthesized from plant products.^[11] Advocates of therapy with bioidentical hormones recommend the use of salivary hormone testing as a means of offering individualized treatment for menopause. These hormones are synthesized from a plant chemical extracted from yams and soy. Bioidentical estrogens are 17 beta-estradiol, estrone, and estriol. (Estradiol is the form of estrogen that decreases at menopause.) Bioidentical progesterone is simply progesterone. It's micronized (finely ground) in the laboratory for better absorption in the body. The ACOG/ASRM statement concluded the following regarding salivary hormone testing:

“There is no evidence that hormonal levels in saliva are biologically meaningful. In addition, whereas saliva is an ultrafiltrate of the blood and in theory should be amenable to testing for “free” (unbound) concentrations of hormones, salivary testing does not currently offer an accurate or precise method of hormone testing. There are several problems with salivary testing and monitoring of free hormone levels:

- First, salivary levels do not consistently provide a reasonable representation of endogenous, circulating serum hormones. There is large within-patient variability in salivary hormone concentrations, especially when exogenously administered hormones are given. Salivary hormone levels vary depending on diet, time of testing, and specific hormone being testing.
- Second, because the pharmacokinetics of exogenously administered compounded hormones cannot be known, it is not possible to estimate with reliability how and when to test saliva to obtain a representative result.
- Third, saliva contains far lower concentrations of hormone than serum and is prone to contamination with blood, infectious agents, and epithelial cells—all of which may affect the level of hormone to be measured.”

AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS^[12]

In 2011, American Association of Clinical Endocrinologists (AACE) published medical guidelines for the clinical practice of diagnosing and treating menopause. The group specifically addressed the use of saliva testing as part of bioidentical hormone therapy, stating:

“Salivary hormone level testing is recommended by many bioidentical hormone proponents as a means of providing patients with “individualized” therapy. Yet these methods are not approved by either the FDA or the Clinical Laboratory Improvement Amendments (the US Health and Human Services agency regulating laboratory standards). Accurate studies have revealed large intra-subject variability in salivary sex

hormone concentrations, which fluctuate depending on numerous variables, including diet, hydration, and circadian rhythm.”

NORTH AMERICAN MENOPAUSE SOCIETY^[13]

In 2012, the North American Menopause Society (NAMS) published a position statement regarding hormone therapy and directly addressed the increased use of custom-made hormone therapy formulas along with salivary hormone testing. NAMS warns that the use of these types of therapy and saliva tests have proven to be inaccurate and unreliable. Specifically, NAMS stated:

“Custom-compounded formulations, including BHT [bioidentical hormone therapy], have not been tested for efficacy or safety; product information is not consistently provided to women along with their prescription, as is required with commercially available HT; and batch standardization and purity may be uncertain. The dosing of compounded progesterone is particularly difficult to assess because the levels in serum, saliva, and tissue are markedly different.”

SUMMARY

There is not enough research to show that salivary hormone testing related to aging or menopause improves diagnosis or health outcomes for people. Therefore, salivary hormone testing is considered investigational for aging and menopause.

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CODES

Codes	Number	Description
CPT	84999	Unlisted chemistry procedure
HCPCS	S3650	Saliva test, hormone level, during menopause

Date of Origin: May 2003