ISSN:3139-0935(Online)

Intemed: International Journal of Research in Integrated Medical Sciences (IJ-RIMS)

Journal homepage: www.intemed.in

Vol.: 2 | Issue: 10 | Oct 2026

Article History: Received: 15-10-2026 Accepted: 19-10-2026 Published:30-10-2026

DOI: doi.org/10.68108/intemed.v2.i10.8

Review Article

A Conceptual and Clinical Study of *Grahani* in Relation to Gut Health and *Sthoulya* (Obesity)

Dr. Dnyaneshwar S. Kharat[1], Prof. Dr. Bharat B. Kadlaskar[2]

[1] Ph.D. Scholar, Department of Kayachikitsa, R. A. Podar Medical College (AYU), Worli, Mumbai – 400018, Maharashtra, India.

Email: Drdnyan32k@gmail.com

[2] Professor & HOD, Department of Kayachikitsa, R. A. Podar Medical College (AYU), Worli, Mumbai – 400018, Maharashtra, India.

Email: drkadlaskar@gmail.com

ABSTRACT:

Background: In Ayurveda, *Grahani* is considered an important site associated with *Agni* and plays a crucial role in digestion, absorption, and maintenance of systemic health. Impairment of *Agni* and disturbance of *Grahani* function may lead to improper digestion and altered metabolic processes. In contemporary medicine, gut health encompasses the functional integrity of the gastrointestinal tract, including digestion, absorption, intestinal barrier function, and interaction with the gut microbiota. Increasing evidence suggests that disturbances in gut function and metabolic regulation may contribute to obesity. *Sthoulya*, described in Ayurveda as a disorder of excessive accumulation of *Meda*, can therefore be studied in relation to disturbances in gastrointestinal and metabolic health. **Aim:** To explore the conceptual and clinical relationship between *Grahani*, gut health, and *Sthoulya* (obesity). **Objectives:** To study the Ayurvedic concepts of *Grahani*, *Agni*, and *Sthoulya*; to assess selected clinical parameters related to gut health and obesity; and to evaluate the possible association between *Grahani* dysfunction and features of *Sthoulya*. **Methodology:** A conceptual review of classical Ayurvedic literature and relevant contemporary scientific literature will be undertaken. Clinically relevant parameters reflecting digestive function, bowel habits, appetite, metabolic status, anthropometric measurements, and other indicators of gut health will be assessed in individuals with *Sthoulya*. The findings will be analysed to identify possible interrelationships between gastrointestinal function and obesity. **Conclusion:** Understanding the relationship between *Grahani* and gut health may provide a broader Ayurvedic perspective on the development and management of *Sthoulya*.

Integrating Ayurvedic concepts with contemporary understanding of gut–metabolic health may contribute to a more comprehensive approach to obesity prevention and management.

Keywords: *Grahani*, *Agni*, *Sthoulya*, Obesity, Gut Health, Digestion, Metabolism, Ayurveda, Gut–Metabolic Axis.

INTRODUCTION

Ayurveda considers proper digestion and metabolism to be fundamental for the maintenance of health. The concept of *Agni* occupies a central position in Ayurvedic physiology and represents the functional principle responsible for digestion, transformation and utilization of food. *Grahani* is described as the site that retains food until appropriate digestion has occurred and subsequently permits its onward movement. Thus, *Grahani* and *Agni* are functionally interdependent. Acharya Charaka has described *Grahani Dosha* in detail in *Grahani Dosha Chikitsa*, emphasizing the importance of normal *Agni* in maintaining proper digestion and tissue equilibrium. When *Agni* is balanced, appropriately consumed food is properly digested and contributes to the maintenance of *Dhatu Samya*. When *Agni* becomes weak or disturbed, digestion becomes incomplete and the partially digested material may be expelled abnormally through the gastrointestinal tract. The classical manifestations of *Grahani Dosha* include irregular or abnormal bowel movements, indigestion, anorexia, thirst, abdominal discomfort, heaviness, burning sensation and weakness.[1] These features indicate that *Grahani* is not merely an anatomical structure but a functional concept encompassing digestion, intestinal regulation and assimilation. Contemporary medicine similarly recognizes the gastrointestinal tract as a complex organ system involved not only in digestion and absorption but also in immune regulation, endocrine signalling, intestinal barrier maintenance and interaction with the gut microbiota.[2] The human gut microbiome participates in fermentation of dietary substrates, production of microbial metabolites and regulation of host metabolic pathways.[3]

Obesity, or *Sthoulya* in Ayurvedic terminology, represents another important condition associated with disturbed metabolism. Ayurveda describes *Sthoulya* in relation to excessive accumulation of *Meda Dhatu* and characteristic alterations in body composition and function.[4] Modern obesity is defined by excessive adiposity and is recognized as a multifactorial chronic disease influenced by dietary intake, physical activity, genetics, endocrine factors, sleep, environmental influences and metabolic regulation.[5] In recent years, the relationship between gut microbiota and obesity has received considerable scientific attention. Gut microorganisms interact with dietary components and produce metabolites such as short-chain fatty acids (SCFAs), bile-acid derivatives and other signalling molecules that may influence energy metabolism, inflammation, appetite and adipose tissue function.[6] However, the available evidence is heterogeneous, and no single microbial pattern can currently be considered a definitive marker of obesity.[7] The Ayurvedic relationship between *Agni*, *Grahani* and *Meda* therefore provides an interesting conceptual framework for examining the connection between gastrointestinal health and obesity. The present article explores this relationship while maintaining a distinction between Ayurvedic concepts and modern biomedical entities.

CONCEPT OF GRAHANI IN AYURVEDA

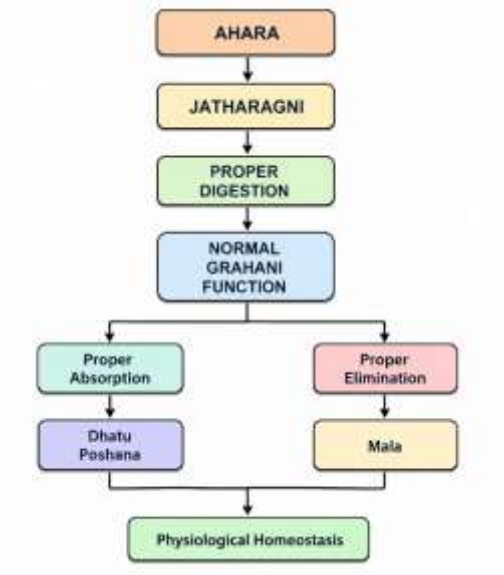
The term *Grahani* is derived from the root *grah*, meaning "to hold" or "to retain." Its principal physiological function is to retain food until it has undergone appropriate digestion. *Grahani* is closely associated with *Agni*, and its normal functioning depends upon the proper strength of digestive fire.According to *Charaka Samhita*, when *Agni* is normal and food is consumed appropriately, digestion occurs properly and physiological equilibrium is maintained. In contrast, when *Agni* becomes weak, food undergoes incomplete digestion and abnormal movement of partially digested material may occur.

Table 1. Conceptual understanding of *Grahani*

Aspect	**Ayurvedic concept**	**Possible contemporary functional domain**
Primary determinant	*Agni*	Digestive and metabolic capacity
Main function of *Grahani*	Retention until proper digestion	Regulation of intestinal contents and transit
Digestion	*Jatharagni*	Gastrointestinal digestion
Assimilation	Formation of *Ahara Rasa*	Nutrient absorption and utilization
Elimination	Proper *Mala Pravritti*	Normal bowel function
Dysfunction	*Grahani Dosha*	Functional gastrointestinal disturbance
Major etiological factor	*Agni Dushti*	Disturbed digestive homeostasis

The correlation in Table 1 is functional and conceptual rather than anatomical or biochemical equivalence.

Flowchart 1. Normal physiology of *Grahani*



GRAHANI DOSHA AND AGNI DUSHTI

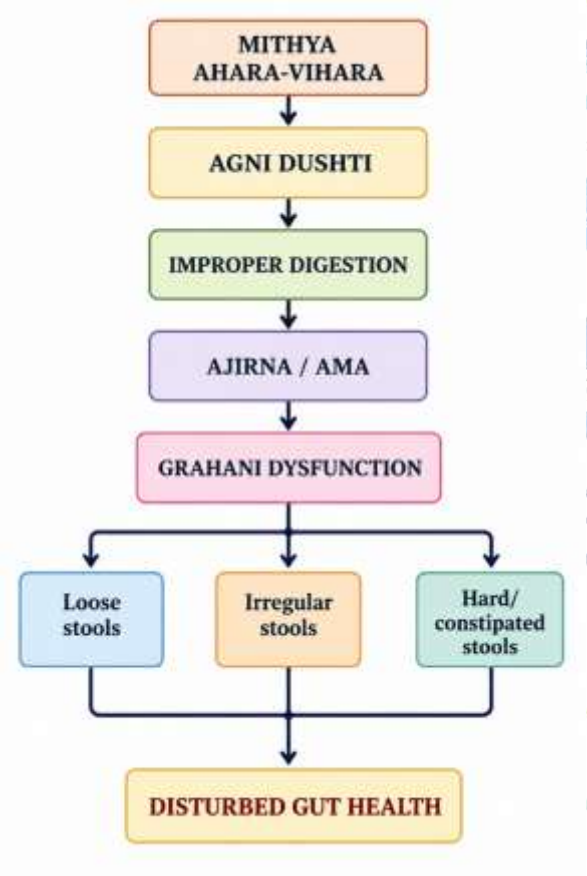
The pathology of *Grahani* is fundamentally linked with impairment of *Agni*. The classical description indicates that weak *Agni* leads to improper digestion, and partially digested food may subsequently pass abnormally. The disturbance may be understood as a sequence beginning with inappropriate dietary and lifestyle factors, followed by impairment of digestion and ultimately abnormal bowel function.

Table 2. Pathogenesis of *Grahani Dosha*

Stage	**Ayurvedic process**	**Functional consequence**
1	Improper *Ahara-Vihara*	Disturbed digestive regulation
2	*Agni Dushti*	Impaired digestion
3	*Ajirna*	Incomplete digestion
4	*Ama* formation	Accumulation of incompletely processed

		material in the Ayurvedic model
5	*Grahani* dysfunction	Abnormal retention and transit
6	Abnormal *Mala Pravritti*	Loose, hard or irregular stools
7	Disturbed nourishment	Possible systemic consequences

Flowchart 2. Ayurvedic pathogenesis of *Grahani*



This model also explains why the management of *Grahani* in Ayurveda emphasizes correction of *Agni* and dietary regulation rather than treatment of bowel symptoms alone.

ROLE OF AGNI IN GUT HEALTH

Agni represents one of the most important concepts in Ayurvedic physiology. It is responsible for transformation of ingested food into forms that can be utilized by the body. The classical framework further describes *Bhutagni* and *Dhatvagni* in relation to subsequent metabolic transformation.[8] Normal *Agni* may therefore be understood as a state of appropriate digestive and metabolic functioning. *Agnimandya* represents diminished digestive capacity and may clinically manifest through heaviness, altered appetite, indigestion and abnormal bowel function. Contemporary gastrointestinal physiology involves coordinated gastric, pancreatic, biliary and intestinal processes. The intestinal epithelium, enteroendocrine system, enteric nervous system, immune system and gut microbiota participate in maintaining digestive homeostasis.[9] The modern understanding of the gut microbiota is especially relevant. Microorganisms residing in the intestine metabolize dietary components that escape host digestion and produce biologically active metabolites, including SCFAs. These metabolites can influence intestinal epithelial function, immune signalling and systemic metabolism.

Thus, a broad conceptual sequence may be represented as:

Healthy Agni → proper digestion → appropriate intestinal function → assimilation → metabolic homeostasis

whereas:

Agni Dushti → disturbed digestion → altered intestinal function → disturbed metabolic processing

This is a conceptual comparison and should not be interpreted as identifying *Agni* with a single biochemical pathway.

GUT HEALTH AND GUT MICROBIOTA

Gut health is a multidimensional concept involving digestion, nutrient absorption, intestinal barrier integrity, immune function, microbial balance and communication between the intestine and other organs. The gut microbiota forms an important component of this system. Dietary fibres are metabolized by intestinal microorganisms, producing SCFAs such as acetate, propionate and butyrate. These metabolites participate in communication between the microbiota and host tissues. The gut microbiota also interacts with bile-acid metabolism, intestinal permeability and inflammatory pathways. These mechanisms may influence host energy balance and adipose tissue physiology. However, human studies demonstrate substantial variability. Factors such as age, geographical location, diet, medication exposure, genetics and metabolic status influence microbial composition. Consequently, the idea of a single "normal" or "obesity-specific" microbiome is an oversimplification. A systematic review and meta-analysis found altered faecal SCFA concentrations in people with obesity but did not demonstrate a consistent significant difference in microbiota abundance at the broad phylum level. This highlights the complexity of interpreting microbiome findings.

CONCEPT OF STHOULYA

Ayurveda describes *Sthoulya* in relation to excessive accumulation of *Meda Dhatu*. Charaka includes *Atisthula* among conditions characterized by abnormal body composition and describes excessive accumulation of adipose tissue together with functional disadvantages. The important causative factors include excessive intake of food, particularly heavy and energy-dense foods, reduced physical activity, excessive sleep and inappropriate lifestyle.

The classical concept may be represented as:

Ati-Ahara + Avyayama + improper lifestyle → disturbance of metabolism → Meda Vriddhi → Sthoulya

Modern obesity similarly results from complex interaction among energy intake, energy expenditure, genetic susceptibility, environmental factors, endocrine regulation and lifestyle. Importantly, obesity is not merely passive fat accumulation. Adipose tissue functions as an endocrine and immunologically active tissue and contributes to inflammatory and metabolic signalling.

RELATIONSHIP BETWEEN GRAHANI AND STHOULYA

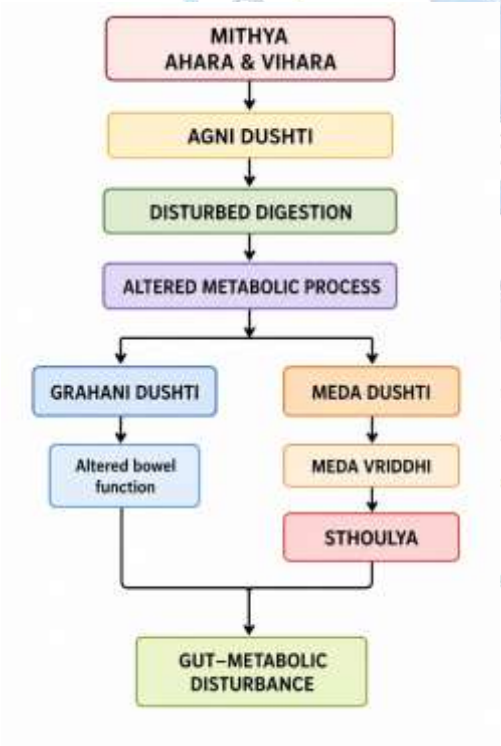
The relationship between *Grahani* and *Sthoulya* can be understood through the common importance given to digestion and metabolism. In *Grahani*, the principal disturbance is manifested through impaired digestion and abnormal bowel function. In *Sthoulya*, the prominent manifestation is excessive accumulation of *Meda*. Although the clinical presentations are different, both can be conceptually linked through disturbances in the processing and utilization of *Ahara*.

Table 3. Conceptual relationship between *Grahani* and *Sthoulya*

Feature	***Grahani***	***Sthoulya***
Central concept	*Agni Dushti*	Disturbed *Meda* metabolism
Main manifestation	Altered digestion and bowel function	Excessive adiposity

Important factors	Improper *Ahara-Vihara*	Excess food, sedentary lifestyle and other factors
Digestive relevance	Direct	Indirect but important
Metabolic relevance	Digestion/assimilation	Energy storage and adipose metabolism
Modern research domain	Gastrointestinal function	Obesity/metabolic disease
Common conceptual factor	**Agni**	**Agni and Meda metabolism**

Flowchart 3. Common conceptual pathway



The above model is a **hypothesis-generating framework** rather than proof that *Grahani* causes obesity.

GUT MICROBIOTA AND OBESITY

The gut microbiota is increasingly recognized as an important component of host metabolism. Experimental and clinical studies have demonstrated interactions between intestinal microorganisms, microbial metabolites, adipose tissue and energy regulation. Gut microorganisms can ferment dietary carbohydrates and generate SCFAs. These molecules can influence intestinal barrier function, immune responses, hormone signalling and energy metabolism. The relationship with obesity, however, is bidirectional and complex. Obesity may itself alter the intestinal environment through dietary changes, inflammation, bile-acid changes and other metabolic factors. Therefore, microbiome alterations may be both contributors to and consequences of metabolic disease.

Table 4. Ayurvedic and contemporary concepts: proposed correlation

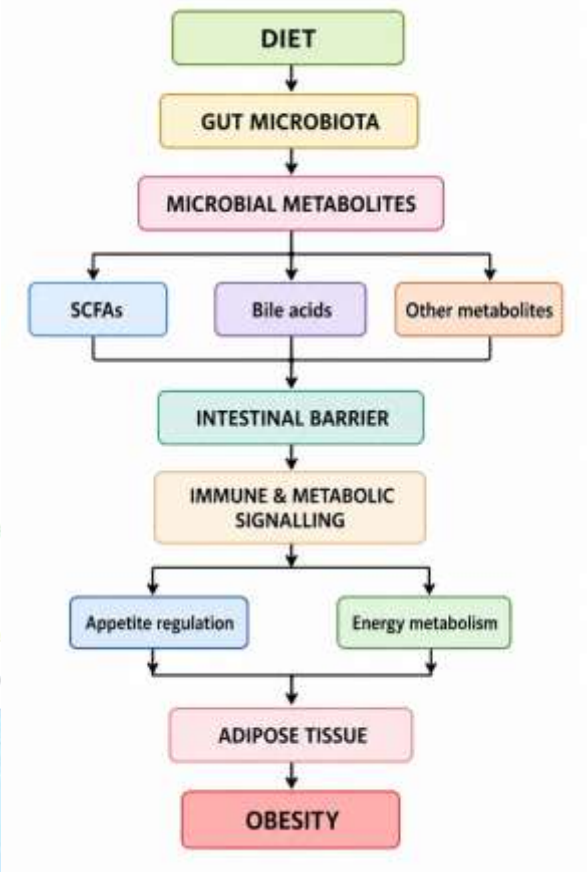
Ayurvedic concept	**Contemporary functional domain**	**Interpretation**
Agni	Digestion and metabolism	Conceptual correlation
Grahani	Intestinal digestive, absorptive and transit functions	Functional correlation
Ama	Incompletely processed material in the Ayurvedic model	No direct modern biochemical equivalent established
Meda Dhatu	Adipose tissue/lipid storage	Functional analogy

Sthoulya	Obesity/excess adiposity	Clinical correlation
Ahara	Dietary intake	Broad correlation
Vihara	Physical activity and lifestyle	Broad correlation
Mala Pravritti	Bowel function	Functional correlation

Table 5. Gut microbiota-related factors relevant to obesity

Factor	Possible role
Dietary fibre	Substrate for microbial fermentation
SCFAs	Influence intestinal, immune and metabolic signalling
Bile-acid metabolism	Modifies host metabolic signalling
Intestinal barrier	Regulates interaction between gut contents and host tissues
Microbial diversity	Associated with metabolic health in several studies
Microbial metabolites	Influence inflammation and metabolism
Dysbiosis	Associated with obesity, although patterns are heterogeneous

Flowchart 4. Modern gut–metabolic pathway



Recent reviews emphasize that gut microbiota–adipose tissue interaction involves multiple pathways, including microbial metabolites, lipopolysaccharide-related signalling, bile acids and pathways affecting adipose tissue metabolism.

At the same time, recent systematic evidence suggests that lifestyle and microbiota-targeted interventions produce heterogeneous microbiome outcomes, and a causal relationship between specific microbiome changes and sustained weight loss has not yet been firmly established.

CLINICAL SIGNIFICANCE

From a clinical perspective, assessment of gastrointestinal health may provide useful information when evaluating individuals with obesity. Symptoms such as constipation, diarrhoea, bloating, abdominal discomfort, irregular bowel movements and altered appetite may coexist with

obesity, although their presence does not establish a causal relationship.

An integrated assessment may include both Ayurvedic and modern parameters.

Ayurvedic assessment

- *Prakriti*
- *Vikriti*
- *Agni*
- *Ama*
- *Koshtha*
- *Mala Pravritti*
- *Ahara-Vihara*
- *Dosha* predominance
- *Meda Dushti*

Contemporary clinical assessment

- Body mass index
- Waist circumference
- Waist-to-height ratio
- Blood pressure
- Fasting blood glucose/HbA1c
- Lipid profile
- Liver function when clinically indicated
- Dietary history
- Physical activity
- Sleep pattern
- Gastrointestinal symptoms

Such an approach may provide a broader picture of the relationship between digestive function and metabolic health.

MANAGEMENT PERSPECTIVE

Ayurvedic management of *Grahani* emphasizes correction of impaired *Agni*, appropriate dietary practices and individualized management according to *Dosha* and disease state. Classical approaches include *Deepana*, *Pachana*, appropriate *Grahi* measures and *Pathya Ahara*.Management of *Sthoulya* emphasizes correction of excessive food intake, increased physical activity and measures aimed at reducing excessive *Meda*.From a modern perspective, obesity management involves individualized nutritional intervention, physical activity, behavioural modification, sleep optimization and pharmacological or surgical therapy when clinically indicated.

A common principle can therefore be identified:

HEALTHY DIET

+

REGULAR PHYSICAL ACTIVITY

+

ADEQUATE SLEEP

+

DIGESTIVE/METABOLIC HEALTH

↓

BETTER GUT–METABOLIC HOMEOSTASIS

However, this apparent similarity should not be interpreted as evidence that traditional interventions automatically produce specific microbiome or

metabolic changes. Such claims require controlled clinical studies.

DISCUSSION

The concept of *Grahani* provides an important Ayurvedic framework for understanding digestion, assimilation and intestinal regulation. According to classical Ayurvedic descriptions, normal *Agni* is essential for proper digestion and maintenance of physiological equilibrium, whereas impaired *Agni* results in incomplete digestion and abnormal bowel function. Modern gastrointestinal science has expanded the understanding of the gut beyond digestion alone. The intestine interacts continuously with microorganisms, immune cells, endocrine signals and the nervous system.[9] The microbiota can metabolize dietary substrates and produce SCFAs and other metabolites that influence host physiology. This provides a potential conceptual connection with the Ayurvedic emphasis on *Ahara*, *Agni* and *Grahani*. Both frameworks recognize that what is consumed and how it is processed can have consequences extending beyond the gastrointestinal tract. The relationship with obesity is particularly relevant. *Sthoulya* is characterized in Ayurveda by excessive *Meda* accumulation and is associated with dietary and lifestyle factors. Modern obesity is likewise influenced by dietary behaviour, physical inactivity and metabolic regulation. The gut microbiota may provide an additional mechanistic bridge. Studies have shown associations between obesity and alterations in microbial composition and microbial metabolites. However, these relationships are complex. For example, systematic evidence does not support the use of a simple Firmicutes-to-Bacteroidetes ratio as a universal marker of obesity, and human SCFA findings have shown considerable heterogeneity. Therefore, the present conceptual model should not suggest that *Grahani* is equivalent to "gut dysbiosis," or that *Agni* is equivalent to a specific metabolic pathway. Instead, *Grahani* may serve as an Ayurvedic functional construct that can generate hypotheses for investigation of gastrointestinal and metabolic physiology. Future research could compare Ayurvedic assessment of *Agni* and *Grahani* with objective parameters such as gastrointestinal symptom scores, anthropometric measurements, glucose metabolism, inflammatory markers, stool microbiome composition and microbial metabolites. Such research would be particularly valuable if conducted longitudinally and with standardized diagnostic criteria. Interventional studies could further investigate whether correction of dietary and lifestyle factors produces parallel changes in Ayurvedic parameters, gastrointestinal symptoms and objective metabolic outcomes.

FUTURE RESEARCH DIRECTIONS

The relationship between *Grahani*, gut health and *Sthoulya* can be investigated using an integrated clinical research model.

Potential parameters include:

1. Assessment of *Agni* status using standardized Ayurvedic criteria.
2. Clinical assessment of *Grahani* symptoms.
3. Anthropometric assessment including BMI and waist circumference.
4. Assessment of dietary pattern and physical activity.
5. Measurement of fasting glucose, HbA1c and lipid profile.

6. Evaluation of gastrointestinal symptoms.
7. Measurement of inflammatory biomarkers where appropriate.
8. Stool microbiome analysis using 16S rRNA sequencing or metagenomic techniques.
9. Assessment of microbial metabolites such as SCFAs.
10. Correlation between Ayurvedic phenotypes and objective biological parameters.
11. Longitudinal evaluation following dietary and lifestyle interventions.

CONCLUSION

Grahani is an important Ayurvedic functional concept centred on digestion, retention, assimilation and appropriate elimination, with *Agni* serving as its fundamental determinant.[1] *Sthoulya* represents excessive accumulation of *Meda* and is associated with dietary, behavioural and metabolic disturbances.Modern research demonstrates that the gastrointestinal tract and its microbiota participate in host metabolism through interactions involving dietary substrates, microbial metabolites, intestinal barrier function, immune pathways and adipose tissue.The common conceptual pathway of Ahara–Agni–Grahani–Meda provides a useful framework for investigating the relationship between digestive health and obesity. The concept may be particularly valuable for generating hypotheses concerning the gut–metabolic axis.However, Ayurvedic concepts should not be directly equated with modern biological entities without experimental validation. *Grahani* is not synonymous with the gut microbiome, *Agni* cannot currently be reduced to a single biochemical pathway, and *Ama* does not have an established one-to-one biochemical equivalent.Future interdisciplinary studies integrating Ayurvedic assessment, clinical parameters, metabolic biomarkers and microbiome analysis may help establish whether the classical concepts of *Grahani* and *Agni* have measurable associations with contemporary markers of gut and metabolic health.Thus, the study of *Grahani* in relation to gut health and *Sthoulya* represents a promising area for integrative research, potentially providing a bridge between classical Ayurvedic physiology and emerging concepts of the gut–microbiota–metabolism–adipose tissue axis.

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