Clinical Research

Development and validation of a Prototype *Prakriti* Analysis Tool (PPAT): Inferences from a pilot study

Sanjeev Rastogi
Associate Professor, Department of Pancha Karma, State Ayurvedic College, Lucknow, Uttar Pradesh, India

**Abstract**

*Prakriti*, for its tangible impacts upon decision making in Ayurvedic clinical practice, requires a thorough and fool-proof method of examination. Conventional methods adopted for *Prakriti* examination are found inconsistent with huge inter- and intra-rater inference variability. By observing the gaps in the field, the present study aims to develop a prototype *Prakriti* analysis tool and its evaluation on inter-rater validity grounds. The study observes that *Vata* and *Pitta* constructs of *Prakriti* identification in Ayurveda have a significant inter-rater correlation (*P* < 0.001 and *P* < 0.01), whereas *Kapha* has less (*P* < 0.02) correlation. It is inferred that for less correlated variables like those of *Kapha*, a better understanding is required to reach a better consensus.

**Key words:** *Prakriti*, tool, validation

**Introduction**

*Prakriti:* The fundamental constructs

*Prakriti* has been one most notable basic construct of Ayurvedic health care philosophy. It fundamentally explains the biological specificity operating at cellular and genomic level and is held largely responsible for distinctions among individuals in various arenas of functions and appearance.[1]

An etymological dissection of the word *Prakriti* resembles prototype in meaning (*Pra* = primary, *Kriti* = creation). *Prakriti* in Ayurvedic reference stands to be a generic unit where individual biological variabilities are distinctly distinguishable on the basis of genetic specificity and epigenetic influences related to an individual. For practical purposes, Ayurveda identifies *Prakriti* as a system specification applicable to individual biological functions. Based upon the basic configurative details of constituting *Dosha*, *Prakriti* has broadly been divided into seven subtypes. It is, however, understood that there can be innumerable such subtypes based upon differential combination of constituting *Dosha*. It is also important to understand that in order to ensure its optimal and long-term functioning, Ayurveda identifies the best set of substrates (*Ahara* and *Vihara*) useful to optimize the system performance referring to *prakriti* subtype. It is therefore clear that knowledge of *Prakriti* subtype may go a long way in health maintenance by making one aware of suitable and unsuitable substances applicable on a one-to-one basis.[2]

Eventually, for its subtle level operating mechanism, *Prakriti* is also held responsible for disease susceptibility and drug behavior variations among people of similar age and physical profiles.[3,4] Due to its complex, yet prospective bearings upon preventive and curative decision making related to Ayurvedic health care, *Prakriti* examination has attracted significant attention since antiquity.[5] For its apparent resemblance, Ayurvedic somatotypical classification based upon *Prakriti* is often correlated to the constitutional psychology classification proposed by Sheldon.[6] The concept of *Prakriti*, however, remains novel for its distinct rooting in Ayurvedic theory of *Pancha-Mahabhuta* and also by a clear proposal of the factors which may possibly influence the performance of variables in a particular *Prakriti*.

The concept of *Prakriti* has remained a subject of extensive exploration in the recent past. As a result, it is now better understood in terms of its genomic and biochemical correlations and subsequent clinical applications.[7-10]

**Methods of examining Prakriti**

Charaka Samhita, an ancient Ayurvedic script (200 BC), describes elaborately about *Prakriti* including the methods of its examination on objective and subjective basis. It describes vividly about various physical, physiological, and behavioral features specific to *Dosha* types, whose presence may give a clue to the dominance of some *Dosha* over the other. An observation of available features thereby indicates the dominance of specific *Dosha*, eventually helping *Prakriti* identification in an individual.[11] This method of *Prakriti* examination is followed by most successors of *Charaka*.
One striking feature notable to classical Prakriti examination in Ayurveda is its reliance upon positive features to reach at a confirmatory Prakriti determination. As a result, absence or presence of features specific to one Dosha has never been allowed to be used as clue to the presence or absence of another Dosha. This so called “inclusion approach” is found more realistic compared to an “exclusion approach” where Dosha determination can also be made on the basis of absence of certain features. In biomedicine too, inclusion diagnoses based upon positive features are found to be more consistent with pathophysiological process, compared to the exclusion diagnoses based upon absence of certain features. The more we learn about the disease process and its systemic effects, the more comprehensible we become to its manifestations. Eventually, on the basis of this learning, many erstwhile exclusion diagnoses are changed into inclusion diagnoses based upon comprehensible features. This change is most visible in the field of psychiatry where exclusion diagnoses ruled for long periods of its history.[12]

It is important to observe that in reference to Prakriti determination, ancient Ayurvedic scholars consistently stressed upon positive features of Dosha in their subtle details to reach at a Prakriti determination through their direct observation in an individual.

Despite its clear mention in classical texts, we observed that current methods of Prakriti determination largely rely upon comparative grading of features in reference to three principal Doshas, namely, Vata, Pitta, and Kapha. It is observed that in these methods, independent variables are considered to be expressed differentially in reference to different Doshas available to the individual. Unfortunately, these methods are found inclined toward false-positive or false-negative Prakriti determination, particularly in conditions where expression of certain variable is falsely presumed and crafted in reference to a dosha group to make the whole series of expression an ordinal one. To make it clear, we can take the example of body built as a variable. A strong and muscular built is proposed to be a feature of Kapha, whereas a thin and slender built is of Vata. It is important to note that in classical texts, Pitta does not find a specific mention about its body built. Ignorance of this fact and consideration of compulsive differential expression of variables in every Dosha category eventually proposes medium built (between Vata and Kapha) as an expression of Pitta. As body built is not a real expression to Pitta, considering medium built as an expression of Pitta eventually brings a false Prakriti determination favoring Pitta.

We have also seen that the current methods of Prakriti diagnosis have not been validated before their use. It is for this reason that inter-rater and intra-rater variability among the results obtained is a frequent observation.[13] Recently, researchers (2011) have approached to develop and validate a self-assessment tool of Prakriti examination. This study, however, cross-examined the newly developed tool against one commonly used tool which itself was not validated statistically. Moreover, self-assessment tools are often considered less reliable compared to physician’s examination for propensity of former toward better choices among the offered options.[15] Considering the difficulties observed in conventional Prakriti determination, CDAC has developed Ayusoft software where Prakriti can be determined with the help of a computer-assisted questionnaire.[13] Though good, this approach still requires validation by making it largely available to Ayurvedic hospitals and research institutes and by cross-checking the inferences generated by this. It is also observed that a Prakriti examination made through conventional ways gives us only a proportional idea about the predominance of certain dosha upon the others. It, therefore, does not explain about the Dosha Prakriti which are actually responsible for a particular Dosha expression. It is important to understand that Dosha Prakriti are the primarily the classes of attributes which ultimately determine the expressions in a particular Dosha group. Every Dosha has got its different set of Gunas, and the features pertaining to every Dosha Prakriti are in correspondence to these Gunas. Consequently, the conventional method of Prakriti examination does not offer any help to clinical decision making in conditions where predominance of a Dosha is required to be judged further in terms of expressing Guna. It is important to understand here that every Dosha is a composite of certain Guna which eventually governs the expression of certain variables coming under its ambit. From Ayurvedic perspective, therefore, Guna is the smallest unit of Dosha, which ultimately helps in determining a Prakriti. We presume that expressing Guna identification along with a proportionate Prakriti determination may have greater implications in Ayurvedic clinical practice compared to Prakriti determination alone. A clearer identification of disease susceptibility within a Dosha group and a better choice of drug referring to the specific component of Dosha may be few immediate rewards to this approach. Making Ayurvedic interventions truly personalized in harmony to the vision conceived and nurtured in Ayurveda could come as its future dividends.[16]

Considering the actual spirit of Prakriti examination elaborated in Charaka Samhita and also considering the limitations observed in current methods employed in Prakriti determination, we developed a prototype Prakriti analysis tool (PPAT) for a rapid, yet dependable diagnosis of Prakriti, including the identification of specific Guna components of Dosha responsible for such a dominance in an individual. For their intricate complexities and philosophical tenets, standardization of diagnostic tools in CAM has always been a challenging issue.[14] Validity tests consisting of construct and content validity and reliability tests consisting of inter- and intra-rater testing are two important parameters on which a new diagnostic tool can be judged for its dependable and unbiased use in clinical application. To make this PPAT standardized, we screened it through validity and reliability tests. The observations made in inter-rater testing were subjected to the correlation analysis to identify the degree of agreement between the observations made by two independent observers in reference to Prakriti determination of the same subjects.[17,18]

Materials and Methods

Designing the prototype Prakriti analysis tool

Identifying the variables

Considering the deficits observable in current methods of
Class represent the quantum unit of every individual attribute class was further fractioned equally among the attribute classes. Subsequently, the score of Dosha how well the individual items in the tool correspond to the whole of Prakriti Scoring to the individual variables, attribute class, and Dosha

To make a quantitative and, thereby, proportionate examination of Dosha, we arbitrarily allocated an equal number to every Dosha. In every Dosha group, this number was then fractioned equally among the attribute classes. Subsequently, the score of every individual attribute class was further fractioned equally among the expressed variables belonging to the same feature class. It was proposed that variables belonging to the attribute class represent the quantum unit of Dosha expression. A cumulative sum of such quanta, in turn, represents quantitative expression of a feature class initially and of a Dosha finally. For the said purpose, every Dosha class was attributed with 1056 as an arbitrary number. This score was divided equally among the attribute classes identified in each Dosha class. As a result, each attribute class was allocated with score of 132, 264, and 96, respectively, in Vata, Pitta, and Kapha groups. This attribute class score was further divided equally among the total measurable expressed features selected in each class. Selection of a particular number against a Dosha class was primarily based upon choosing a number which can be divided suitably to give a complete number to every expressed feature. We have seen this kind of arbitrary scoring pattern earlier in many studies pertaining to Prakriti analysis. It is important to understand here that the numbers assigned against any feature in the proposed method are just arbitrary and are designed for the ease of statistical analysis with a care for proportionate scoring in reference to the share of a particular feature in the whole of Prakriti representation referring to a particular Dosha. This scoring thereby looks logical and reliable for such studies.

Content validity

Content validity of any interrogatory tool is concerned with how well the individual items in the tool correspond to the concept of what is being measured. It is usually tested using the qualitative techniques. Content validity of the PPAT was examined primarily in reference to the classical description of Prakriti examination available in Charaka Samhita. Considering their measuring feasibility, subsequently, the selected variables in PPAT were also cross-validated by an expert group consisting of six Ayurvedic experts for their suitability as a dependable expression to identify dominance of a particular dosha.

For such a test, we adopted a novel content validity testing method that involves cross-examination of selected variables for their suitability to represent dominance of a Dosha. Each Ayurvedic expert was provided with a sheet consisting of selected variables in PPAT and was asked to give their inference against each variable in terms of its level of applicability for dominance identification of a particular Dosha. The inferences were recorded in four levels, namely, strongly applicable, applicable, not applicable, and strictly not applicable. An analysis of total inferences from the expert group was made. Variables rated for the first two levels were finally taken up for further testing.

Construct validity

To make a construct validity test, every individual variable identified in PPAT was cross-examined by an expert group to see the feasibility of expressions to be examined by either of the common methods of clinical examination, namely, inspection and interrogation. As a result, attribute class of madhur in Kapha Dosha group and attribute class of Katu and Amla in Pitta Dosha group were dropped from the final PPAT for their selective expressibility and difficulty in observation. Remaining variables were found convincing for their dependable examination through inspection or interrogation methods.

Selection of volunteers for pilot testing of PPAT

To exclude any disease-induced change in the expressed variables, and thereby to ensure the observation of the innate Prakriti of an individual uninfluenced by any endogenous or exogenous factor, we selected healthy volunteers of either sex, aged between 20 and 30 years. To ensure the homogenous sampling, we selected a group of Ayurveda college students belonging to the same level and asked for their consent to participate in the study. This was a nonrandomized sampling and everyone belonging to the same level was invited to participate in the study. Every consented participant was further enquired about their health status to ensure participation of healthy volunteers only in the study.

Conduction of the testing

Selected and consented volunteers were then explained about the study and their role in the study. Every volunteer was further provided with a PPAT format to be filled in for their demographic details. Afterward, every volunteer was examined by an Ayurveda expert (selected arbitrarily from an Ayurveda teaching institute on the basis of their clinical experience) for the presence of the variables representing various Doshas in the given format. After completion of the examination, each positive variable (represented as yes in PPAT) was counted for the individual score to give rise to a final score against each attribute class and Dosha. As per the total scores obtained against each Dosha, a judgment about Dosha dominance was made. As per the differential scores obtained in various attribute classes, a particular Guna contribution to Dosha dominance was also observed.
Inter-rater reliability
To test inter-rater reliability of PPAT, same volunteers were subjected for Prakriti examination by another experienced Ayurveda expert without being explained about the earlier observations made in the first test.

Statistical analysis
Scores obtained for each attribute class and for each Dosha category by two independent observers were collected on a spreadsheet and were subjected to a correlation (based on ranked total score) analysis using SPSS (version 11.5).

Results
Totally 34 volunteers were registered for the study. All of them were examined on PPAT by the first rater. Among all the registered volunteers, however, only 26 could complete a subsequent second examination by another independent rater. As the study intended to analyze the inter-rater reliability, only those volunteers who had completed the examination by both raters were included for statistical analysis. The mean age of the 26 analyzed volunteers (16 males and 10 females) was 24.3 years (range 22–30 years). The net score obtained for each attribute class and for each Dosha category by one observer was compared to the net score obtained by the other observer for the same group. A correlation coefficient of 0.4074 for Kapha, 0.5245 for Pitta, and 0.8081 for Vata was observed. This correlation was found less significant (for degree of freedom \( n - 2 \), where \( n = 26 \)) in reference to Kapha observations (\( P < 0.02 \)), significant (\( P < 0.01 \)) to Pitta, and highly significant (\( P < 0.001 \)) to Vata observations [Table 1]. A correlation among various attribute classes in individual Dosha groups was also done as per their total rank scores obtained to identify the principal features contributing to the most to the Dosha identification correlation. It is seen that about half of Kapha attributes (5 among 11) contributed significantly to the correlation. The correlation ratio among attribute classes was much higher in Pitta and Vata where three-fourths (3 among 4) and all (8 among 8) attributes contributed to the correlation [Table 2].

Discussion
Development of a practical, valid, and handy tool to make a Prakriti diagnosis may have enormous implications. To make the best use of fundamental construct of Prakriti as a dependable tool of decision making in Ayurveda aiming ultimately toward a personalized medicine, we need to develop tools which can give us reproducible results in variable settings. Unfortunately, despite its irrevocable importance to Ayurvedic therapeutics, method of Prakriti examination has rarely been scrutinized to the level of acceptable contemporary research tools. Development of a tool catering to the physician’s need without distorting the classical constructs of Ayurveda is thereby a primary requirement of research in Ayurveda. Validating these tools to the contemporary needs is the next step which would be required to refine the tool as per the needs arising during the pragmatic testing. This study approached to develop the PPAT on lines of these needs felt with due care for the classical vision of Prakriti (content validity) and also the designing of the tool (construct validity).

| Table 1: Correlation of inferences of two independent investigators about individual Prakriti clusters |
|---------------------------------------------------------------|
| **Dosha cluster** | **Correlation coefficient** | **P value** |
|-------------------|-----------------------------|-------------|
| Kapha             | 0.4074                      | <0.02       |
| Pitta             | 0.5245                      | <0.01       |
| Vata              | 0.8081                      | <0.001      |

| Table 2: Correlation of inferences of two independent investigators about various attributes contributing to Prakriti identification |
|-------------------------------------------------------------------------------------------------------------------------------|
| **Dosha** | **Attribute** | **Correlation coefficient** | **P value** |
|-----------|---------------|----------------------------|-------------|
| Kapha     | Snigdh        | -0.05773                   | -           |
|           | Slakshna      | 0.0                        | -           |
|           | Mridu         | -0.01522                   | -           |
|           | Sara          | 0.3857                     | 0.05        |
|           | Sandra        | 0.0019                     | -           |
|           | Manda         | 0.4755                     | 0.01        |
|           | Staimitya     | 0.4399                     | 0.02        |
|           | Guru          | 0.5608                     | 0.01        |
|           | Sheeta        | 0.4564                     | 0.02        |
|           | Picchila      | 0.0                        | -           |
|           | Accha         | -0.0347                    | -           |
| Pitta     | Ushna         | 0.3947                     | 0.05        |
|           | Tikshana      | 0.6577                     | 0.001       |
|           | Drava         | 0.2120                     | -           |
|           | Visra         | 0.4720                     | 0.01        |
| Vata      | Ruksha        | 0.7002                     | 0.001       |
|           | Laghu         | 0.7002                     | 0.001       |
|           | Chala         | 0.5580                     | 0.001       |
|           | Bahu          | 0.6172                     | 0.001       |
|           | Shighra       | 0.6654                     | 0.001       |
|           | Sheet         | 0.6108                     | 0.01        |
|           | Parush        | 0.8178                     | 0.001       |
|           | Vishad        | 0.5422                     | 0.01        |

At the same time, it also cared for the deficits noticed in the current methods of Prakriti examination [Figure 1]. As disease and environmental factors are supposed to affect the external expression of many variables crucial to Prakriti examination, we tried to minimize these influences in the study by selecting healthy volunteers of young age. To minimize high sample variability, it limited the recruitment of sample to a pre-identified setting only (an undergraduate college).

Observations made in this study are significant in many ways. This study reinforces the earlier attempts of establishing the significance of Dosha variables in terms of their measurable expressibility.[13,14] By observing the highly significant correlation between Vata Dosha features observed by two interdependent raters, we can easily infer that Vata presents with stable features which are easily observable, offering less inter-rater variability. This observation is endorsed further by the finding that every variable in Vata was contributing significantly to this correlation. This observation gives us an idea that the Vata features commonly have a uniform level of agreement, and so these features can easily be utilized for
making a Prakriti analysis tool. In Pitta, the correlation is less marked, yet it is contributed by three of its four principal attribute classes. For Drava property of Pitta, a correlation could not be established. Drava property in Pitta is found to be expressed by features like: (1) lax and soft flesh and joints and (2) profuse sweat, urine, and stool formation. An absent correlation suggests that these features are associated with difficulty of interpretation and so an agreement is difficult to be arrived. It is therefore important to understand that to make a valid tool, we need to bring more clarity in examining these expressions more objectively. The study was unable to find a comparable significant correlation between the independent observations made for Kapha, as it is observable in case of Vata and Pitta. Among the 11 attribute classes of Kapha, only 5 contributed toward a significant correlation. The ones which did not contribute to correlation in Kapha are: Snigdha, Slakshna, Mridu, Sandra, Picchila, and Acheha. These attributes in reference to their respective variables are again required a thorough revisit to their construct for their better appreciability by any and every observer.

How does a P value of 0.02 of Kapha lead to a less significant state in a correlation study? This question can best be addressed by realizing the conceptual gap that exists between statistical significance given by a P value (i.e. the probability that is observed due to chance) and statistical inference (i.e. the interpretation of a significant P value – what does it really mean). The former is just the result of a mathematical computation, whereas the latter results from logic and reasoning. Here, we have a significant P value for a very low correlation in Kapha. Correlation coefficients do not imply cause–effect, but merely association. This means that as we simply increase the sample size, we are bound to achieve low P values, even if the association is weak or quasi-nonexistent. This is what we have here: a statistically significant P value for Kapha for a correlation that is so weak that it fails to explain over 75% of the variance.

Limitations of the study
Despite the significant observations in finding the possibility of reaching a more dependable PPAT during the process, the study is also found to have its own limitations. As the volunteers were undergraduate Ayurveda students, an expression bias during the interpretation could not be ruled out. It is also suggested that a rater’s experience may play crucially in making judgments about the expressions of features related to various Doshas. An examiner’s bias is a known limiting factor with such tools unless the examiners are trained well with the proposed tool and with the method of expression observations. The study also has a limited external validity for it was done with two observers only. To have a better external validity, it is required to be tested with many Ayurveda experts. A high inter-rater variability in the Kapha group marks the need of more serious efforts to make a uniformly applicable construct of the tool, particularly in reference to Kapha.

Conclusions
Designing a Prakriti analysis tool in tune with the contemporary scientific research requirements is an ambitious task. This is a multistep process requiring a thorough analysis of needs and resources, followed by a careful crafting. The craft is then required to be tested and retested on various parameters till it reaches a consensus of producing convincing, yet reproducible results in variable settings. This study analyzes the designing of a PPAT and tests it on various validity and reliability parameters. It is observed that the tool is good in reaching a consensus in reference to Vata and Pitta expressions, whereas it is not able to make a convincing correlation between observations made for Kapha group. Besides indicating the deficits related to the construct of the tool under study, it also indicates the intricate complexity associated with observations made in reference to Kapha features compared to Vata and Pitta. So, Kapha features are required to be designed more carefully to make their better appreciation by every observer, and therefore to reach a better agreement. Despite its limitations, this study adds determinately toward the ultimate objective of evidence-based decision making in Ayurveda, a mandatory move if Ayurveda is thought to be mainstreamed as a dependable and reproducible form of medical intervention.[19,20]

Acknowledgments

Author express his deep gratitude to Prof. Francesco Chiappelli, Ph.D., University of California at Los Angeles for his unstring support in designing the study and analyzing the observations obtained. Help from Dr. Sandeep Dwivedi, State Ayurveda College, Lucknow in execution of the pilot testing of PPAT is also deeply acknowledged.

References

1. Bhushan P, Kalapa J, Arvind C. Classification of human population based on HLA gene polymorphism and the concept of Prakriti in Ayurveda. J Altern Complement Med 2005;11:349-53.
2. Patwardhan B, Bodeker G. Ayurvedic genomics: Establishing a genetic basis for mind body typologies. J Altern Complement Med 2008;14:571-6.
3. Dahanukar SA, Thatte UM. Current status of Ayurveda in phytomedicine. Phytotherapy 1997;4:359-68.
4. Rastogi S. Building bridges between Ayurveda and Modern Science. Int J Ayurveda Res 2010;1:41-6.
5. Rastogi S, Chiappelli F. Bringing evidence basis to decision making in Complementary and alternative medicine (CAM): Prakriti (Constitution) analysis in Ayurveda. In: Chiappelli F.; Caldeira Brant, X.M.; Neagos, N.; Oluwadara, O.O.; Ramchandani, M.H. editors. Evidence-based Practice towards Optimizing Clinical Outcomes. Berlin Heidelberg: Springer;2010. p. 91-106.
6. Sheldon WH. The varieties of human physique: An introduction to constitutional psychology. New York: Harper; 1940.1-347
7. Pine D. Introduction of Ayurveda to Chiropractic, Building a functional bridge, Proceedings of the SacroOccipetal Technique Research Conference, Nashville, Tennessee;2011 p. 86-101.
8. Aggarwal S, Negi S, Jha P, Singh PK, Stobdan T, Pasha MA, et al. EGLN1 involvement in high altitude adaptation revealed through genetic analysis of extreme constitution types defined in Ayurveda. Proc Natl Acad Sci U S A 2010;107:18961-6.
9. Rizzo-Sierra CV, Ayurvedic genomics, Constitutional psychology and endocrinology: The missing connection. J Altern Complement Med 2011;17:465-8.
10. Prasher B, Negi S, Aggarwal S, Mandal AK, Sethi TP, Deshmukh SR, et al. Whole genome expression and biochemical correlates of extreme constitutional types defined in Ayurveda. J Transl Med 2008;6:48.
11. Charaka, Agniveshakriti Charaka Samhita, commentary. In: Tripathi BN, editor.Vimana Sthana 8/96.Varanasi: Chaukmbha publication; 2008.
12. National Institute of mental health in England [home page on the
Appendix - 1

*Preliminary version of Prototype Prakriti Analysis Tool (PPAT)*

Note: Scores in PPAT are arbitrarily assigned assuming that each Dosha has an equal opportunity to be represented in the body. This is how we reached at proposing equal score to each Dosha. Total score for each Dosha was then distributed among the number of classical Gunas available to each Dosha. Each Guna in a specific Dosha category thereby arrived at having a composite equal score. An individual Guna score in a Dosha category was then further subdivided as per the available features against each Guna. This kind of scoring has given a proportionate weightage to each Guna and their features in every Dosha for the ease of understanding about their individual and cumulative role in determining a Prakriti.

| Kapha trait | Guna | Features | Yes/no (scores) |
|-------------|------|----------|-----------------|
| 1.          | Snigdha | Oily skin (scratch the mid flexor aspect of Rt. forearm with some blunt object. If mark is visible, it is dry; if not, it is oily) | 60 |
| 2.          | Slakshna | Smooth skin | 60 |
| 3.          | Mridu | Less tolerant to difficulties | 20 |
|             |       | Fair complexion | 20 |
|             |       | Good looking face features | 20 |
| 4.          | Madhur$^4$ | Good sexual capacity$^2$ | 30 |
|             |       | More offspring (0–2 = no, 3 or more = yes, including abortions or still birth) | 30 |
| 5.          | Sara | Compact muscular body$^4$ | 30 |
|             |       | Stable body (almost consistent body weight) | 30 |
| 6.          | Sandra | Well-formed, proportionate body parts | 30 |
|             |       | Well-nourished body parts | 30 |
| 7.          | Manda | Slow physical movements | 20 |
|             |       | Slow conversation | 20 |
|             |       | Slow eating | 20 |
| 8.          | Staimitya | Delayed (well-thought) beginning of actions | 30 |
|             |       | Cool temperament (less anxiety) | 30 |
| 9.          | Guru | Slow walking speed | 60 |
| 10.         | Sheeta | Less appetite | 15 |
|             |       | Less thirst | 15 |
|             |       | Less sweating | 15 |
|             |       | Tolerant to heat | 15 |
| 11.         | Picchila | Compact joints (not prominent) | 60 |
| 12.         | Accha | Pleasing face | 20 |
|             |       | Pleasing complexion | 20 |
|             |       | Pleasing voice | 20 |

Total score$^3$
### Pitta trait

| No. | Guna | Features                                                                 | Yes/No |
|-----|------|--------------------------------------------------------------------------|--------|
| 1.  | Ushna | - Intolerant to heat<br>- Soft textured<br>- Fair complexion<br>- Increased presence of moles<br>- Good appetite and thirst<br>- Premature graying and fall of hair | 15     |
| 2.  | Tikshna | - Voracious eater (eat good quantity at a time)<br>- Voracious drinker (drink good quantity at a time)<br>- Good digestive capability<br>- Sharp reacting, argumentative<br>- Intolerant to discomforts | 18     |
| 3.  | Drava | - Lax and soft flesh and joints<br>- Profuse sweat, urine, and stool formation | 45     |
| 4.  | Visra | Increased and bad odor from armpit, head, and body | 90     |
| 5.  | Katu | - Less sexual capacity²<br>- Less no. of children (0–2 = yes, 3 or more = no, including abortions or still birth) | 45     |
| 6.  | Amla | - Less sexual induration²<br>- Less no. of children (0-2 = yes, 3 or more = No, including abortions or still birth) | 45     |

**Total score³**

### Vata trait

| No. | Guna | Features                                                                                                                                                  | Yes/No |
|-----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1.  | Ruksha | - Dry skin<br>- Poorly formed and poorly nourished body<br>- Dry, poor, interrupted, and unpleasant voice<br>- Reduced sleep | 30     |
| 2.  | Laghu | - Quick but incoherent movements<br>- Quick but incoherent appetite<br>- Quick but incoherent speech | 40     |
| 3.  | Chala | Unstable joints and body parts (moves them while sitting) | 120    |
| 4.  | Bahu | - Increased number of visible tendons and veins on extremities<br>- Over talkative | 60     |
| 5.  | Shighra | - Quick indulgence in some activity<br>- Increased amount of anxiety<br>- Quick reactions in the form of attachment, detachment<br>- Fearfulness or timidity<br>- Quick understanding and grasping<br>- Less memory | 20     |
| 6.  | Sheet | - Intolerant to cold (does not like)<br>- Prone to cold-induced ailments (common cold, Upper Respiratory Tract Infection) | 60     |
| 7.  | Parush | Rough hair, nail, body, foot, and hand | 120    |
| 8.  | Vishad | Prominent body parts (as joints)<br>- Crepitus in joints while moving | 60     |

**Total score³**

---

1. Quantity of semen is deleted as a feature of madhur (Kapha), katu and amla (Pitta) properties because of its inability to be identified precisely in males and inapplicability to females.

2. These features are specific to married people. For unmarried people, alternative questions are to be framed.

3. Total score is 960 for each Dosha. Dosha scores in every individual are to be calculated as per their availability and than a predominance may be determined.

4. Physical features like compact body and musculature are to be judged in accordance with the gender and geographic standards.

---

*Reproduced with kind permission from ©Springer-Verlag Berlin Heidelberg 2010. It was originally published in Evidence-Based Practice: Toward Optimizing Clinical Outcomes, Chiappelli F, Caldeira Brant XM, Neagos N, Oluwadara OO, Ramchandani M*
Appendix - 2

Revised version of Prototype Prakriti Analysis Tool (PPAT) for use in healthy volunteers

Prototype Prakriti Analysis Tool for Healthy Volunteers (PPAT-HV)

Investigator’s name ..............................................................................................................
Reg. No........................................ Reg. date.................................

Demographic record
Volunteer’s name...........................................Age/Sex..............................
Height ..............................................Weight........................................
Address ..............................................................................................................................
.................................................................................................................................Contact No........................................

Features to identify Kapha components
(Each Guna corresponds to 96 points. Feature scores are divided as per the number of total features available to a particular Guna.)

| No. | Guna   | Clinical feature                        | Method of observation | Score | Yes/No |
|-----|--------|----------------------------------------|-----------------------|-------|--------|
| 1.  | Snigdha | Oily skin                              | Inspection            | 96    |        |
| 2.  | Shlakshana | Smooth skin                        | Palpation             | 96    |        |
| 3.  | Mridu   | Fair complexion                        | Inspection            | 48    |        |
|     |         | Good looking face                      |                       | 48    |        |
| 4.  | Sara    | Compact and muscular body             | Inspection and palpation | 96  |        |
| 5.  | Sandra  | Well-formed, proportionate body parts | Inspection            | 48    |        |
|     |         | Well-nourished body parts             | Inspection            | 48    |        |
| 6.  | Manda   | Slow motor activity                   | Interrogation         | 32    |        |
|     |         | Slow conversation                     | Interrogation         | 32    |        |
|     |         | Slow eating                           | Interrogation         | 32    |        |
| 7.  | Staimitya | Delayed beginning of activities     | Interrogation         | 48    |        |
|     |         | Less anxious                          | Interrogation         | 48    |        |
| 8.  | Guru    | Slow and constant walking speed       | Interrogation         | 96    |        |
| 9.  | Sheeta  | Less appetite                          | Interrogation         | 24    |        |
|     |         | Less thirst                           | Interrogation         | 24    |        |
|     |         | Less sweating                         | Interrogation         | 24    |        |
|     |         | Tolerant                              | Interrogation         | 24    |        |
| 10. | Picchila | Compact joints                        | Inspection            | 96    |        |
| 11. | Accha   | Pleasing face                          | Inspection            | 48    |        |
|     |         | Pleasing voice                         | Hearing               | 48    |        |

Total Kapha score................................................................./1056

Features to identify Pitta components
(Each Guna corresponds to 264 points. Feature scores are divided as per the number of total features available to a particular Guna.)
No. | **Guna** | Clinical feature | Method of observation | Score | Yes/No
--- | --- | --- | --- | --- | ---
1. | **Ushna** | Intolerant to heat | Interrogation | 44 |  
 |  | Soft textured hair and skin | Inspection | 44 |  
 |  | Fair complexion | Inspection | 44 |  
 |  | Increased presence of mole | Inspection | 44 |  
 |  | Increased appetite and thirst | Interrogation | 44 |  
 |  | Premature graying and fall of hair | Inspection | 44 |  
2. | **Tikshna** | Eat and drink good quality of food at a time | Interrogation | 66 |  
 |  | Instantly reacting, argumentative | Interrogation | 66 |  
 |  | Intolerant to discomforts | Interrogation | 66 |  
 |  | Unable to tolerate hunger and thirst | Interrogation | 66 |  
3. | **Drava** | Lax and soft flesh and joints | Inspection | 132 |  
 |  | Profuse sweat, urine, and stool formation | Interrogation | 132 |  
4. | **Visra** | Increased and offensive odor from armpit, head, and body | Interrogation | 264 |  

**Total Pitta score** /1056

**Features to identify Vata components**
(Each guna corresponds to 132 points. Feature scores are divided as per the number of total features available to a particular guna.)

No. | **Guna** | Clinical feature | Method of observation | Score | Yes/No
--- | --- | --- | --- | --- | ---
1. | **Ruksha** | Dry skin | Inspection | 33 |  
 |  | Poorly formed and nourished body | Inspection | 33 |  
 |  | Interrupted and unpleasant voice | Hearing | 33 |  
 |  | Interrupted, reduced, and shallow sleep | Interrogation | 33 |  
2. | **Laghu** | Fast walking speed | Interrogation | 44 |  
 |  | Fast intake of food | Interrogation | 44 |  
 |  | Fast movements, hyperactive | Inspection, Interrogation | 44 |  
3. | **Chala** | Unstable joints and body parts (moves them while sitting) | Inspection, Interrogation | 132 |  
4. | **Bahu** | Increased number of visible tendons and veins on extremities | Inspection | 66 |  
 |  | Over talkative | Inspection, Interrogation | 66 |  
5. | **Shighra** | Quick indulgence in some activity | Interrogation | 22 |  
 |  | Increased anxiety | Interrogation | 22 |  
 |  | Quick attachment and detachment | Interrogation | 22 |  
 |  | Fearfulness, timidity | Interrogation | 22 |  
 |  | Quick understanding and grasping | Interrogation | 22 |  
 |  | Less memory | Interrogation | 22 |  
6. | **Sheet** | Intolerant to cold (does not like) | Interrogation | 66 |  
 |  | Prone to cold-induced illness (common cold, URTI) | Interrogation | 66 |  
7. | **Parush** | Rough hair, nail, skin, foot, and hand | Inspection | 132 |  
8. | **Vishad** | Prominent joints | Inspection | 66 |  
 |  | Crepitus in joints while moving | Interrogation | 66 |  

**Total Vata score** /1056

Total composite score is 1056 for each Dosha. Individual Dosha scores are the cumulative sum of scores obtained against the positive features as per the recorded responses.

Physical features like compact body and musculature are to be judged in accordance with the gender, ethnic, and geographic standards.
प्रकृति निर्धारण मापदंड का विकास एवं सत्यापन

संजीव रस्तोगी

आयुर्विदिक चिकित्सा में अंतिम निर्णय पर पहुँचने में अपने स्पष्ट प्रभावों के कारण प्रकृति का अचूक निर्धारण बेहद आवश्यक है। प्रकृति निर्धारण हेतु सामान्यतः प्रयोग में लाए जाने वाले उपायों में एक ही जांच कर्ता द्वारा विभिन्न समय पर अथवा दो जांचकर्ताओं द्वारा एक समय पर किये गए निदान में काफी वैचित्र्य मिलता है। इस प्रकार की विभिन्नता को ध्यान में रखते हुए इस अध्ययन में प्रकृति निर्धारण हेतु एक प्रारम्भिक उपाय तथा पुनः इन उपायों का विभिन्न प्रयोग कर्ताओं द्वारा प्रयोग करने समय सम्भावित वैचित्र्य का अध्ययन किया गया। उपरोक्त अध्ययन में वात तथा पिता के लक्षणों में कफ की तुलना में विभिन्न प्रयोगकर्ताओं के नतीजों में अधिक साम्यता देखी गयी। कफ के लक्षणों में साम्यता लाने के लिये अधिक प्रयासों की आवश्यकता महत्त्वपूर्ण की गयी।